



# Utah Water Assessment & Conditions Monitoring (Drought Webinar)

The meeting will begin shortly



Thank you to our contributors





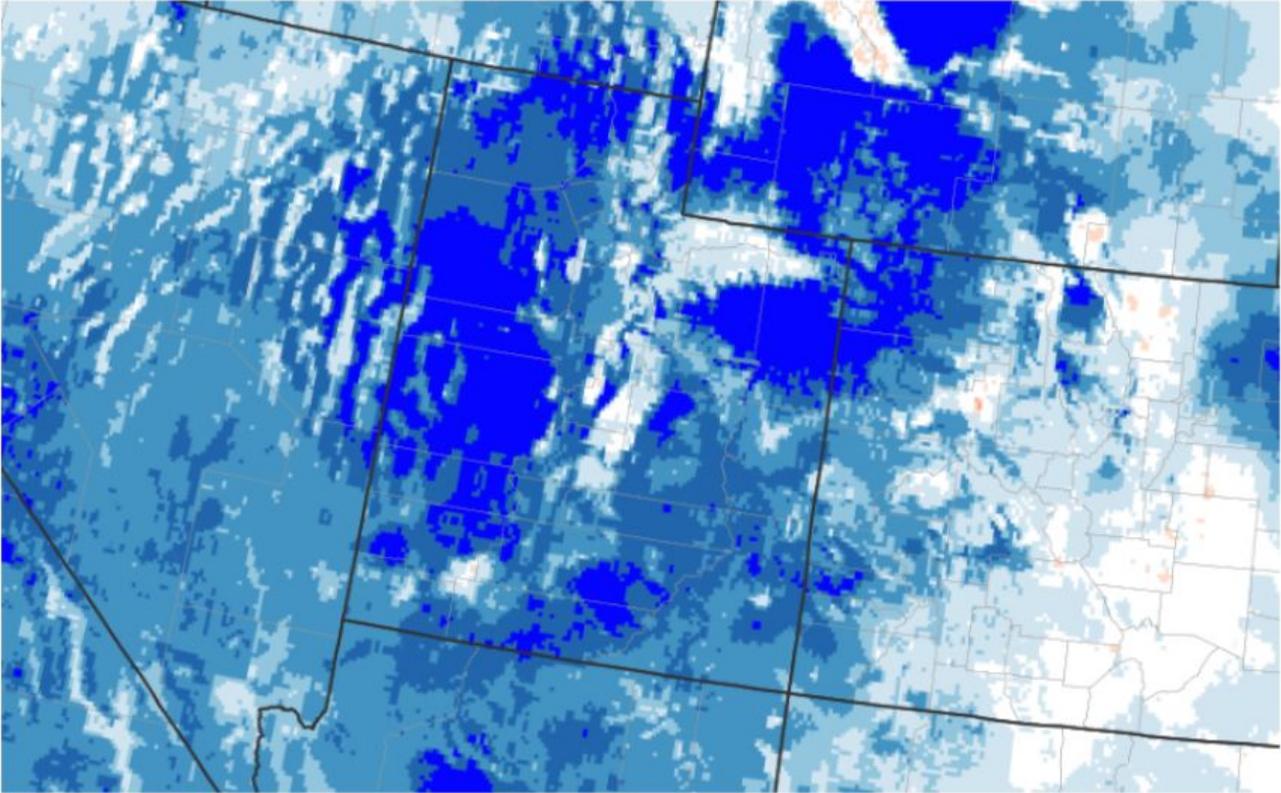
# **Utah Water Assessment & Conditions Monitoring Webinar**

**March 7, 2023**

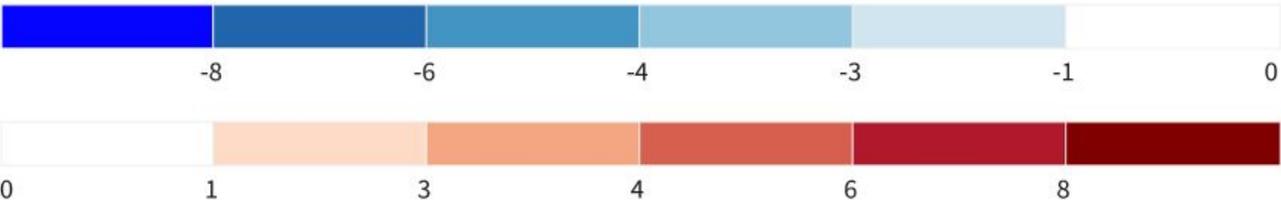
# Temperature 30 day departure from normal

Active weather has kept cold air in place.

Next two months of temperatures will play an important role in the spring runoff.

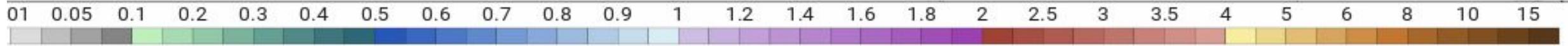


Departure from Normal Max Temperature (°F)

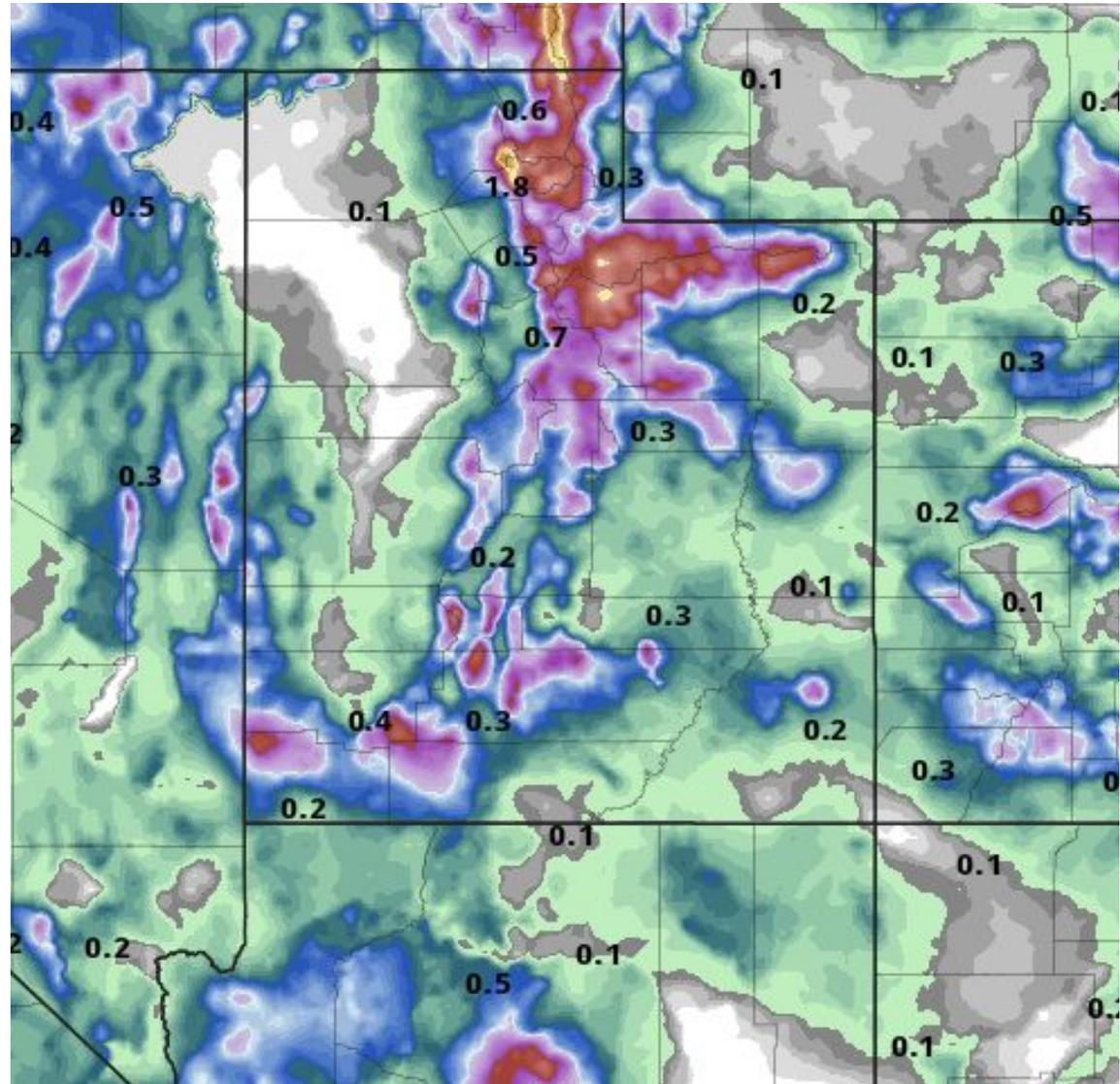


Source(s): UC Merced, Climate Engine  
Data Valid - 03/03/23

# Precipitation 7 day history



Series of winter storms have focused on northern Utah's mountains, with most counties have seen continued snow accumulation.

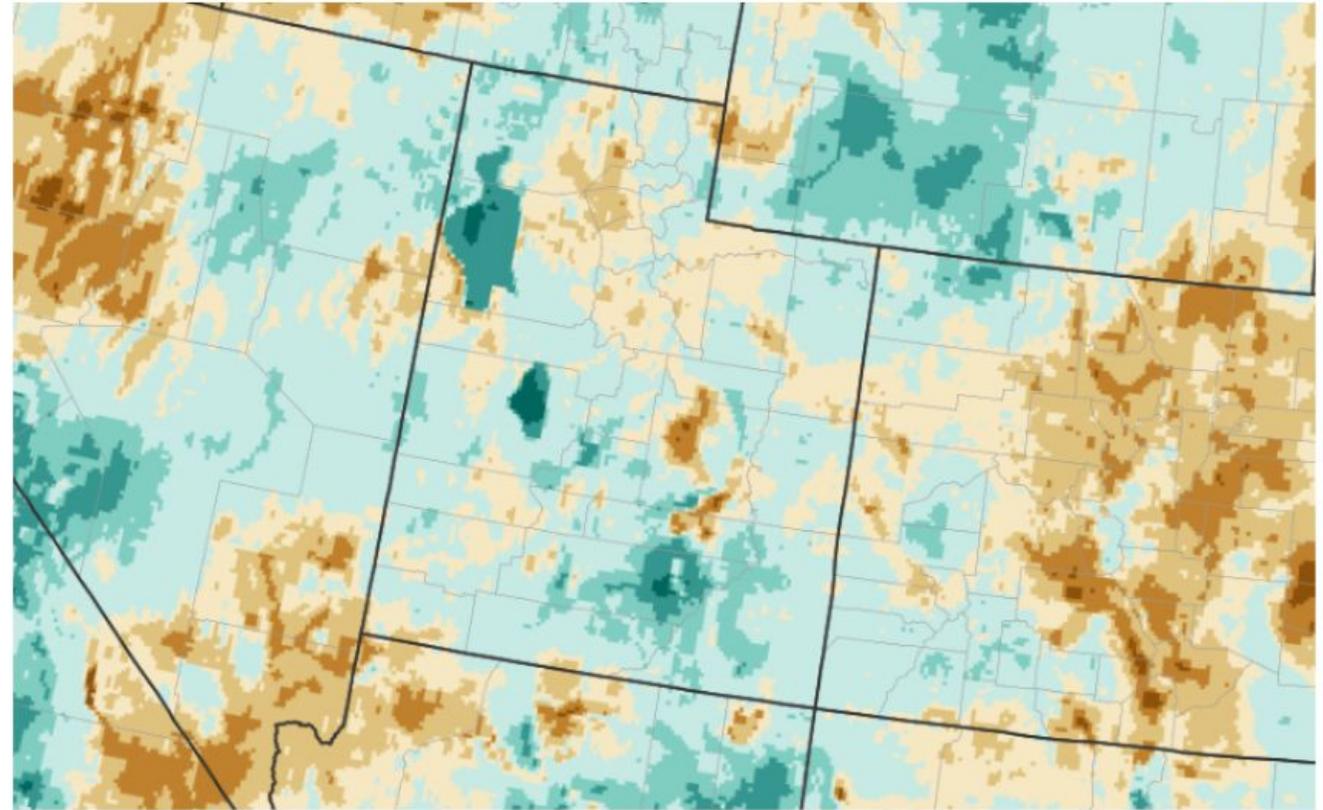


# Precipitation 30 day % of average

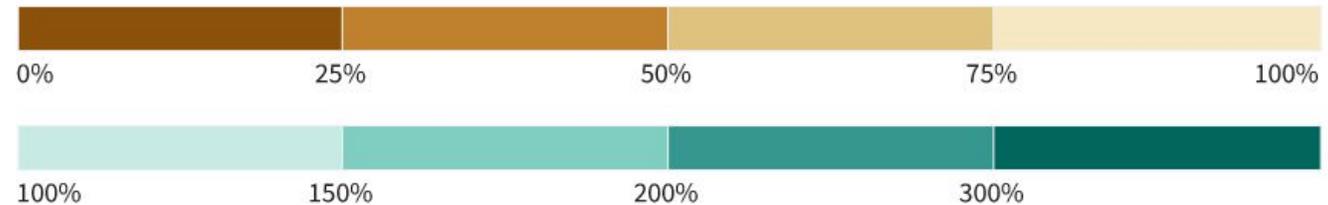
February began dry, but trended wetter than normal for many areas.

Several counties saw much below normal precip despite active weather patterns.

### 30-Day Percent of Normal Precipitation



Percent of Normal Precipitation (%)



Source(s): UC Merced, Climate Engine

Data Valid - 03/03/23

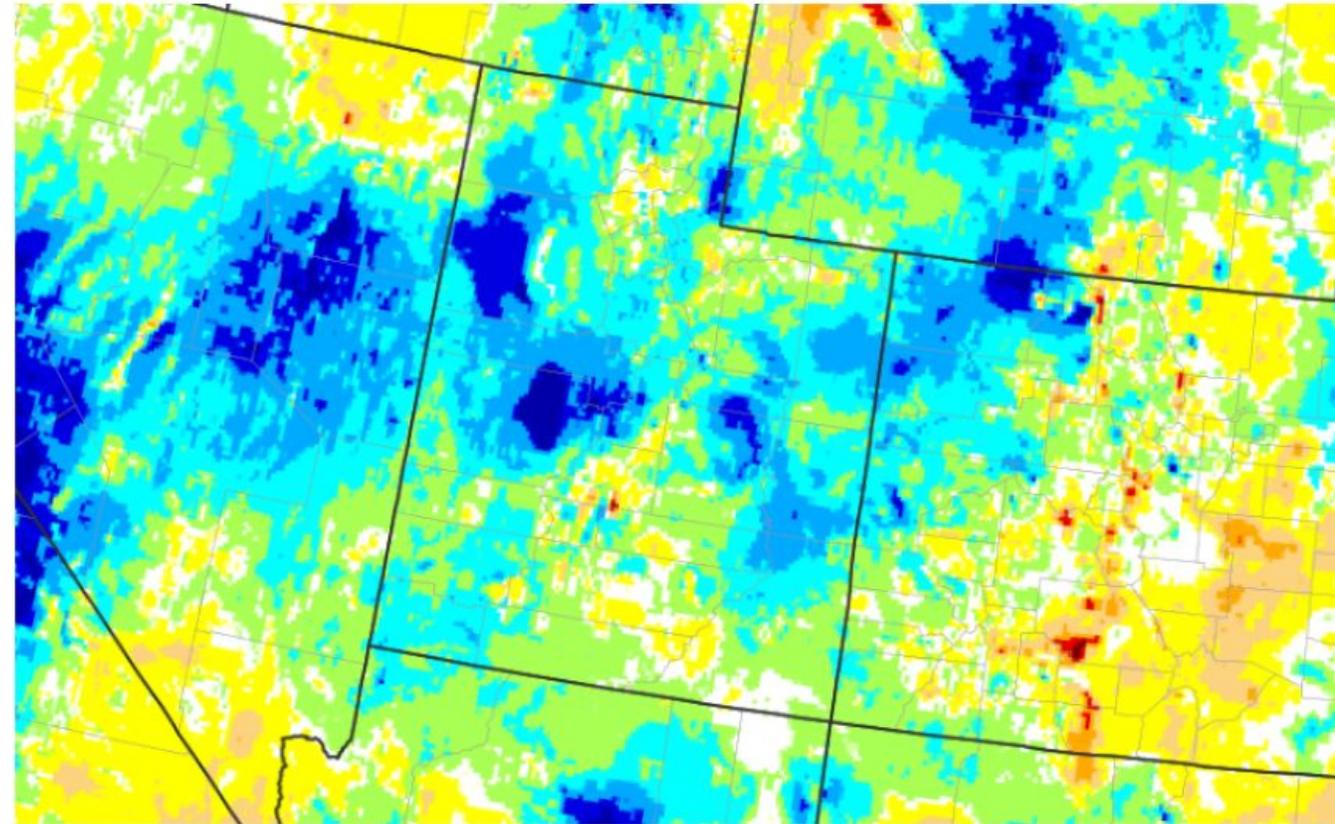
**Drought.gov**

# Palmer Drought Severity Index (PDSI)

## Palmer Drought Severity Index (PDSI)



Wintertime conditions have greatly improved drought conditions, although the south-central counties on the Wasatch back are still lagging behind and are seeing slight drought conditions persist.



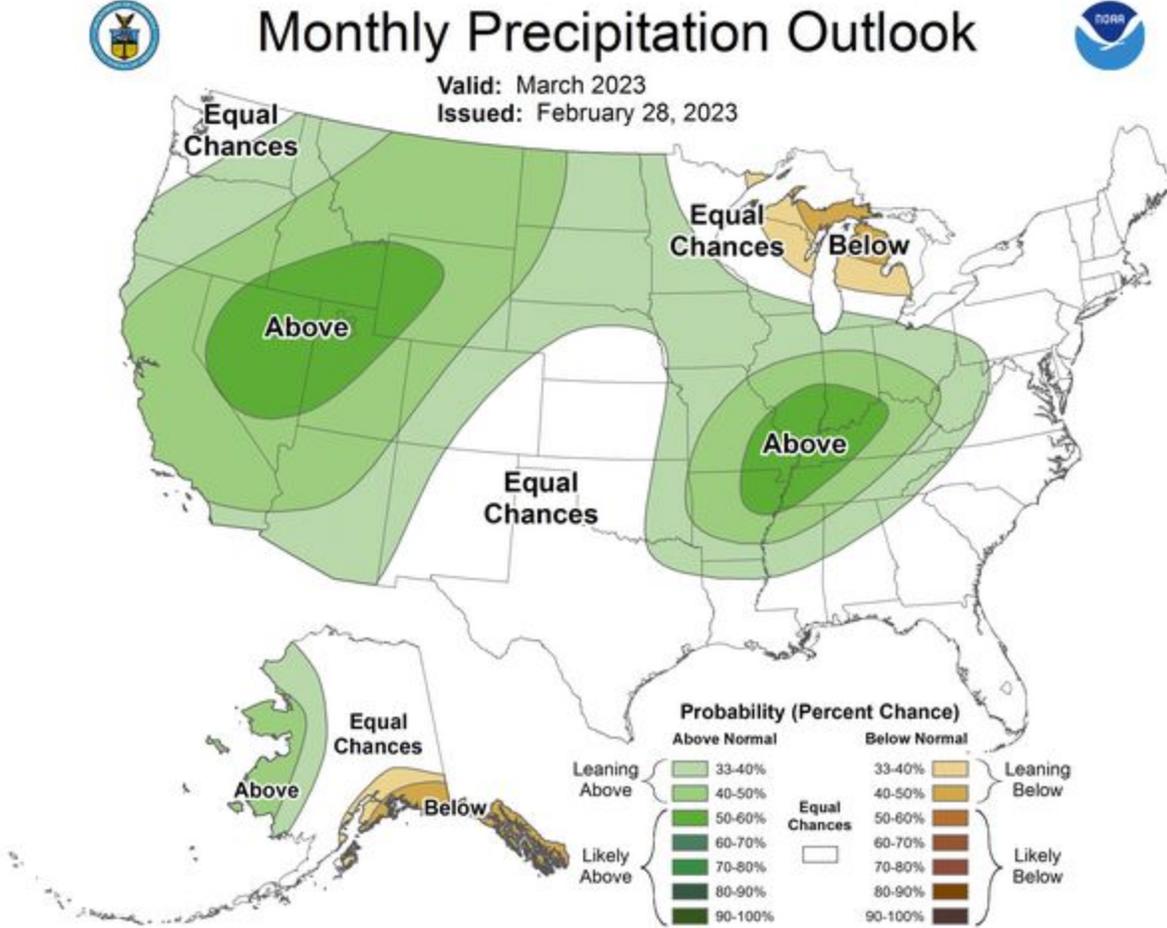
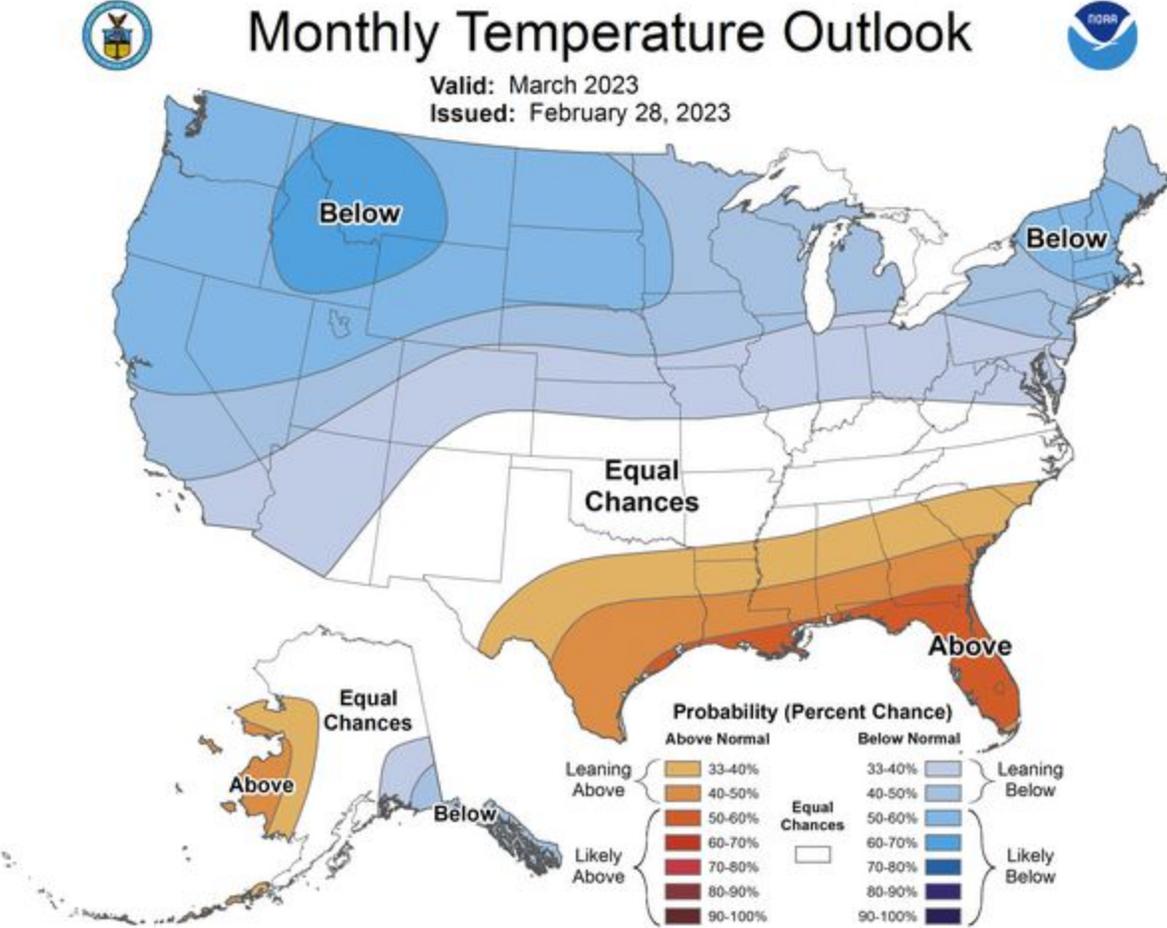
Dry Conditions (Relative)



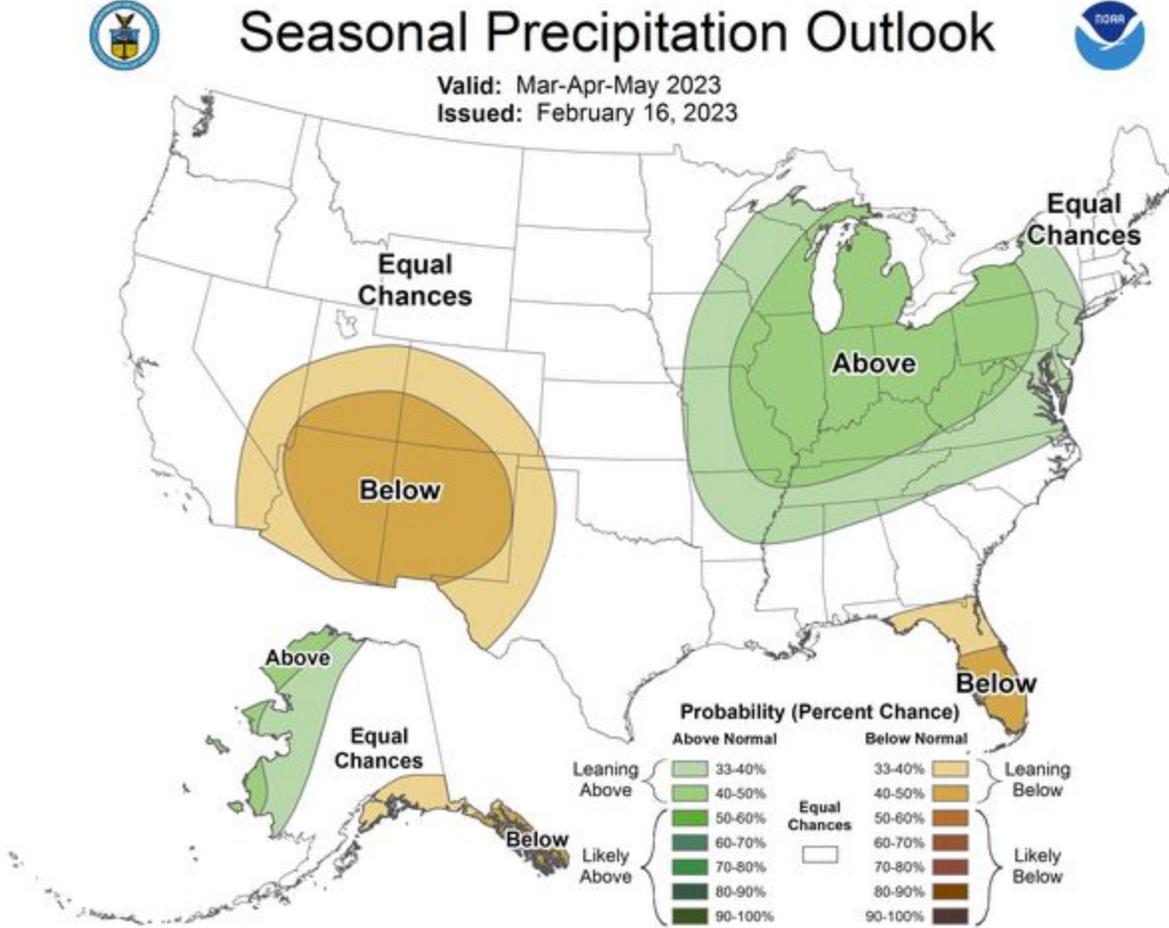
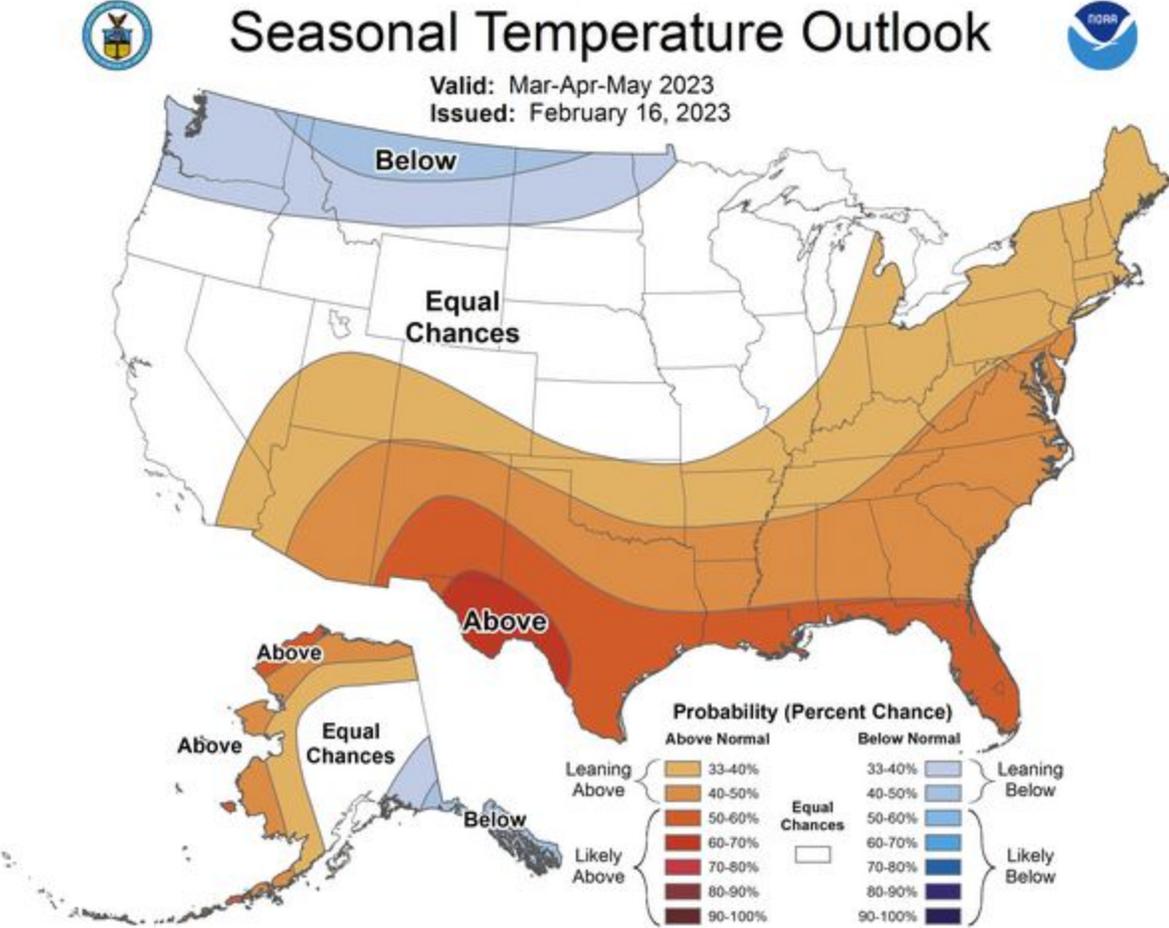
Wet Conditions (Relative)



# CPC March Outlook



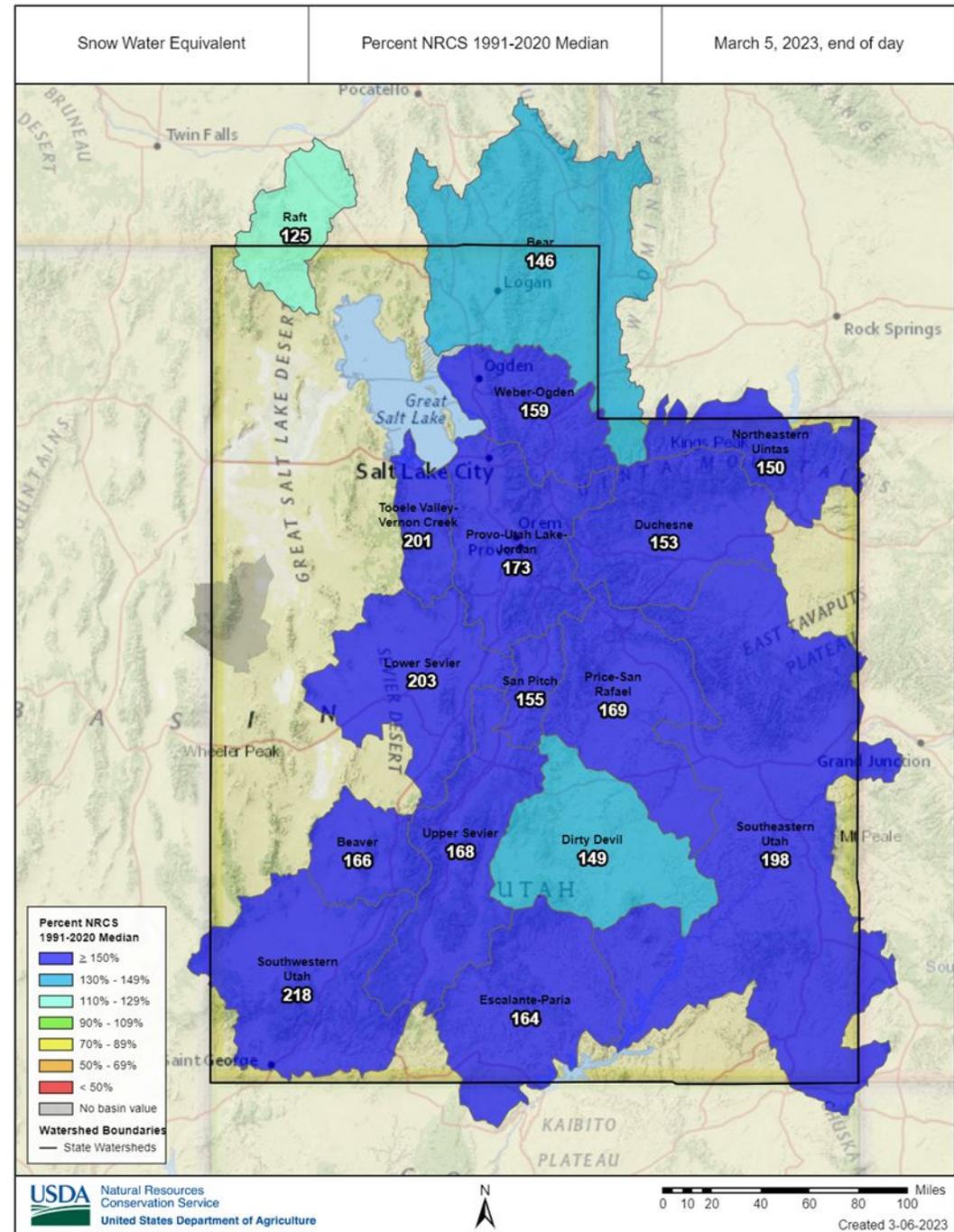
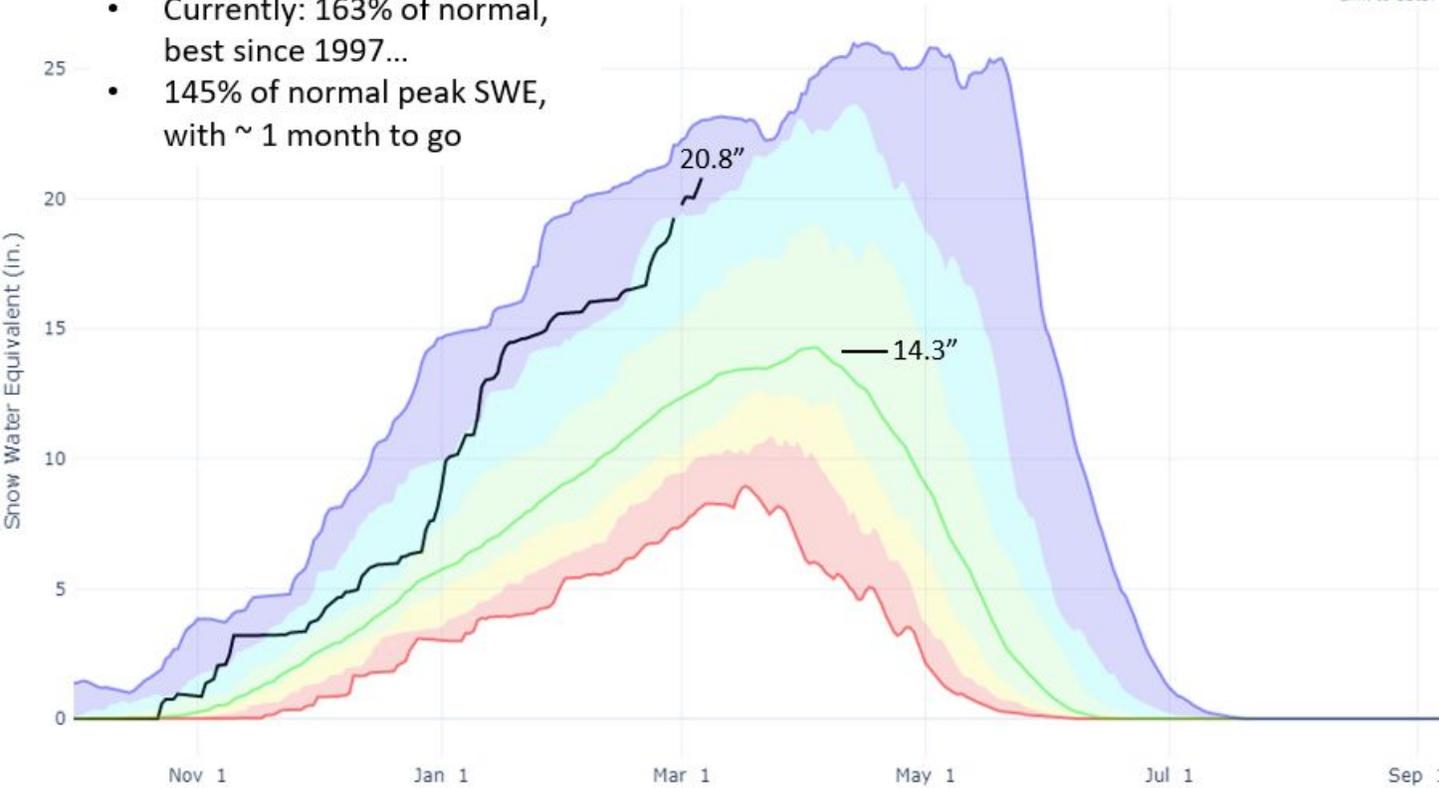
# CPC March-April-May Outlook



# Statewide SWE

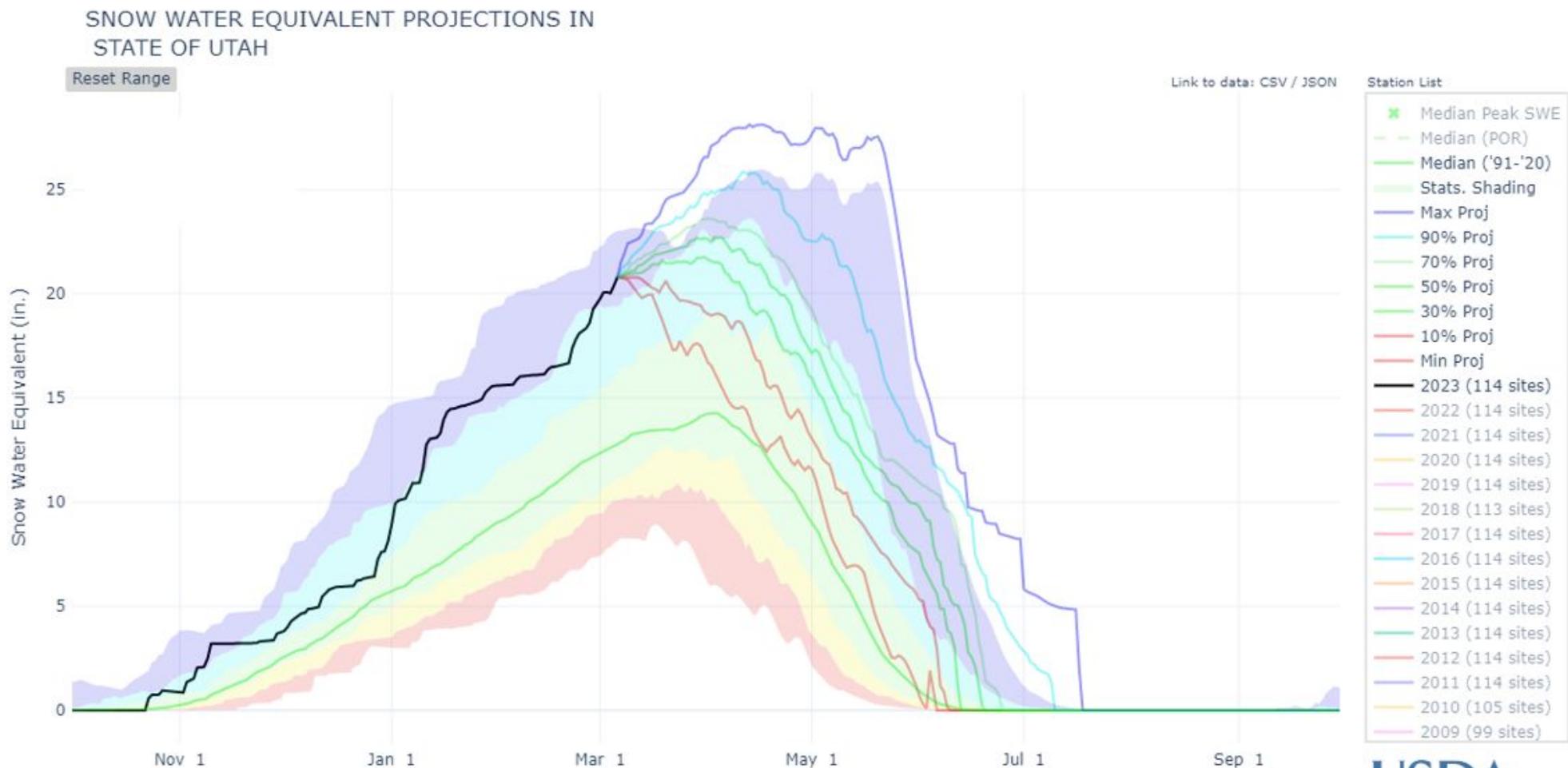
## SNOW WATER EQUIVALENT IN STATE OF UTAH

- Currently: 163% of normal, best since 1997...
- 145% of normal peak SWE, with ~ 1 month to go



Agency - NRCS Snow Survey  
 Presenter - Jordan Clayton

# Statewide SWE: projections



- Range of possible outcomes, including new record winter
- **Most probable max statewide SWE:**
  - **22.7" → would be 159% of normal**

## Precipitation deficits for Water Years 2020-2023

units = inches

	Precipitation deficits							% change in deficit
	WY20	WY21	WY22	WY23 *	Normal	WY20-22 deficit	WY20-23 deficit	
Bear	27.7	25.1	30.1	37.3	31.3	11	5	55%
Beaver	21.1	26.3	27.9	37.2	30.1	15	7.9	47%
Deep Creek	15.3	20	20.8	29.4	20.8	6.3	-2.3	surplus
Dirty Devil	17.6	19.8	21.5	28	23.1	10.4	5.5	47%
Duchesne	20.5	24.3	28.4	32.5	26.9	7.5	1.9	75%
Escalante	17.1	19.7	20.9	26.4	23.4	12.5	9.5	24%
Lower Sevier	16.1	20.4	22.4	37.5	26.1	19.4	8	59%
NE Uintas	21.5	24.6	27.5	29.2	25.8	3.8	0.4	89%
Price-San Rafael	19.9	20.6	27	30.9	25.8	9.9	4.8	52%
Provo-Utah Lake-Jordan	27.3	28.9	33.2	42	34.2	13.2	5.4	59%
Raft	32	24.8	33.9	42.4	36.7	19.4	13.7	29%
San Pitch	21.1	20.7	26.9	31.9	27.1	12.6	7.8	38%
SE Utah	19.9	22.4	24.8	33.5	25.5	9.4	1.4	85%
SW Utah	20.1	21.3	25.4	35.2	24.2	5.8	-5.2	surplus
Tooele-Vernon Creek	24.1	25	29	38.9	32.3	18.8	12.2	35%
Upper Sevier	19.3	21.3	23.4	32.1	25.8	13.4	7.1	47%
Weber-Ogden	28.2	27.3	32.8	43.5	35.3	17.6	9.4	47%
<b>Statewide</b>	<b>23.6</b>	<b>24.2</b>	<b>28.3</b>	<b>36</b>	<b>29.3</b>	<b>11.8</b>	<b>5.1</b>	<b>57%</b>

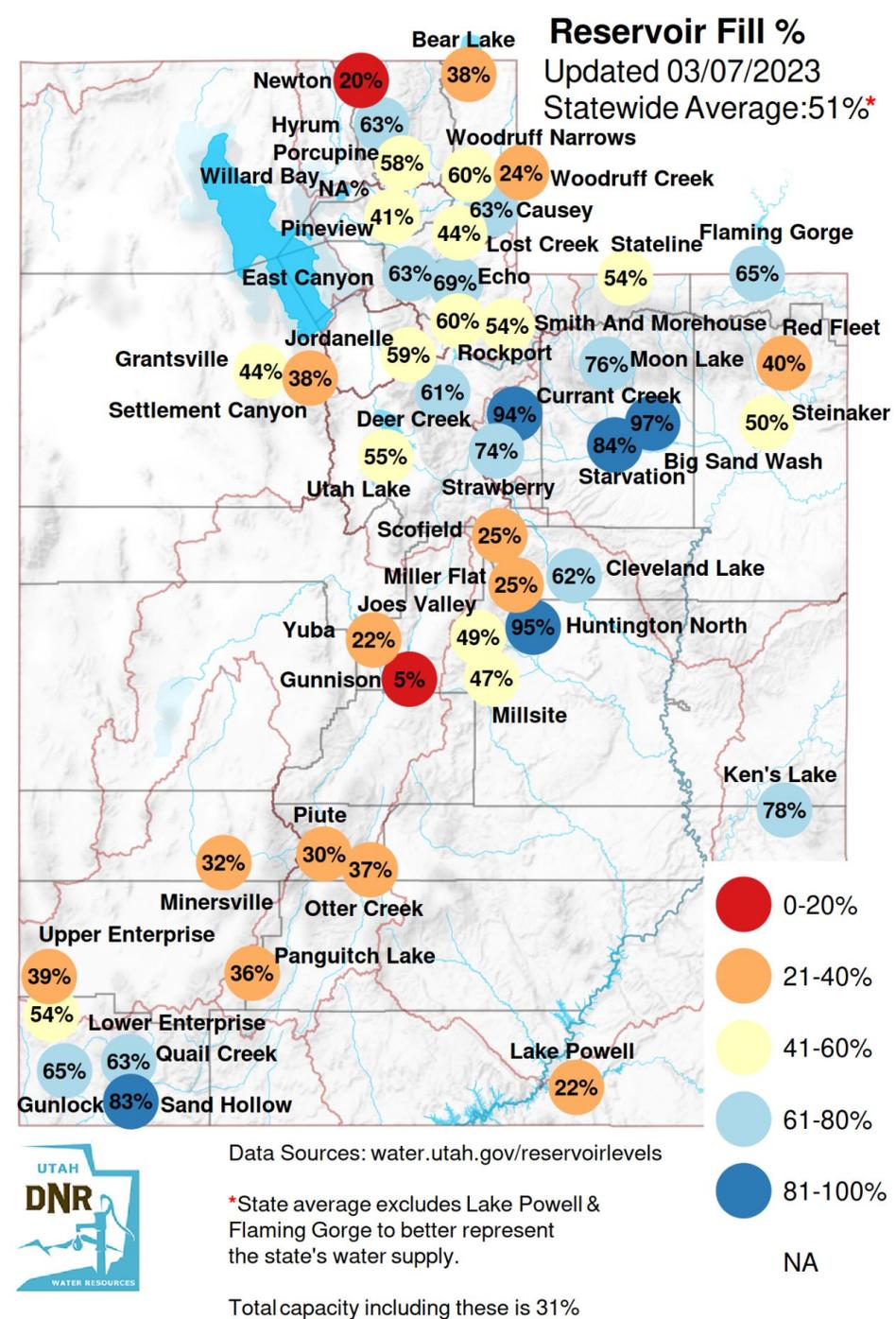
\* projected

- Used 50% exceedance probability projection for precipitation to obtain WY23 total
- **WY23 is cutting deficits in half for most basins (blue)**
- Several basins projected to eliminate deficit or come close (purple)
- Other basins still have far to go to recover (red)

**Instructive for  
drought  
assessment?**

Agency - NRCS Snow Survey  
Presenter - Jordan Clayton

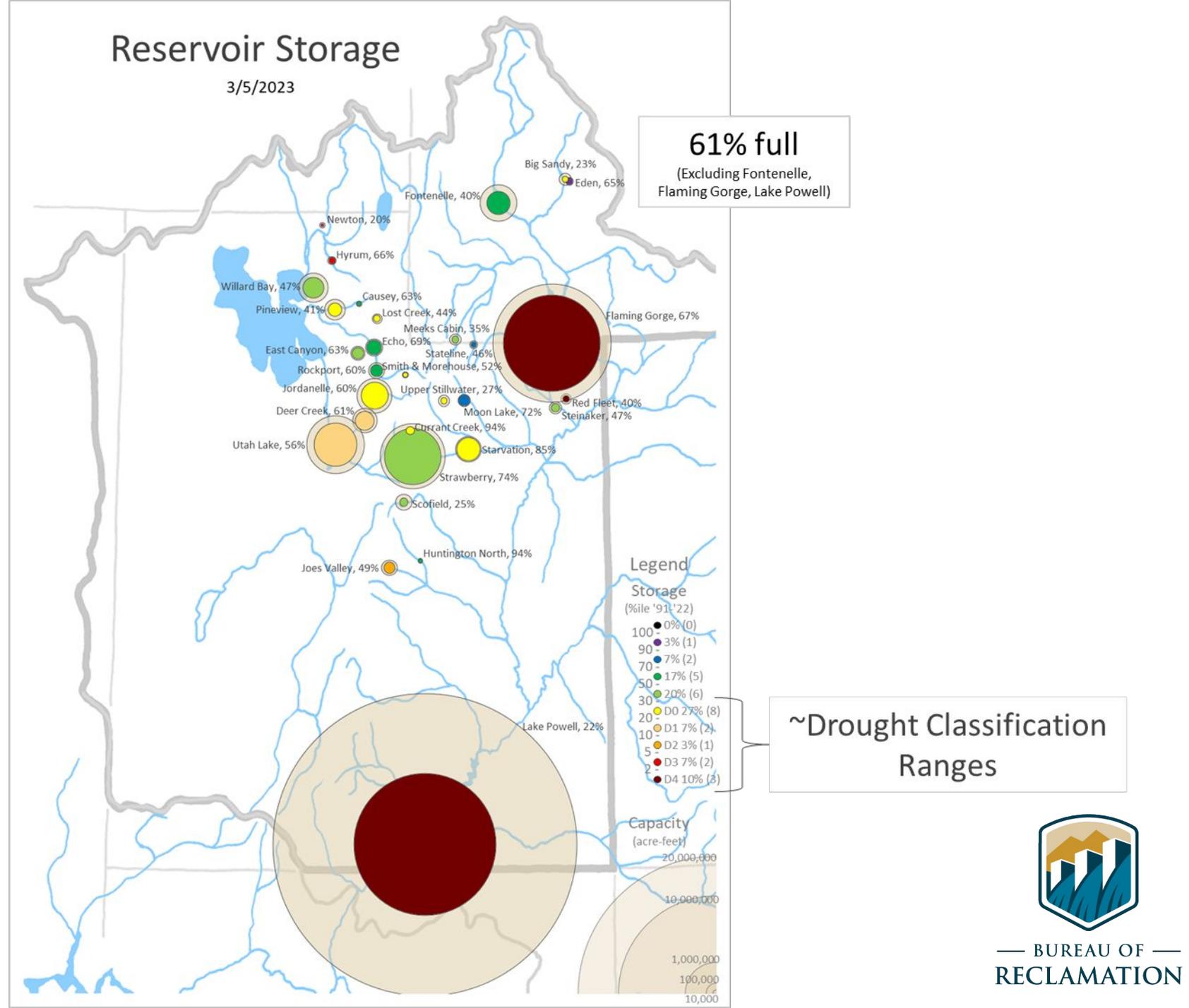
- Same as 2 weeks ago (51%)
- Yuba rose above 20%
- Gunlock is having issues
- State average 61% typically this time of year



# Reservoir Levels

No significant changes since last meeting:

- Overall storage increased ~1% to 61% full
- Cold temperatures have kept the snow in place.
- We haven't seen rain-on-snow or snowmelt inflows.
- Reservoirs continue to slowly fill at ~typical baseflow rates.



# Reservoir Levels

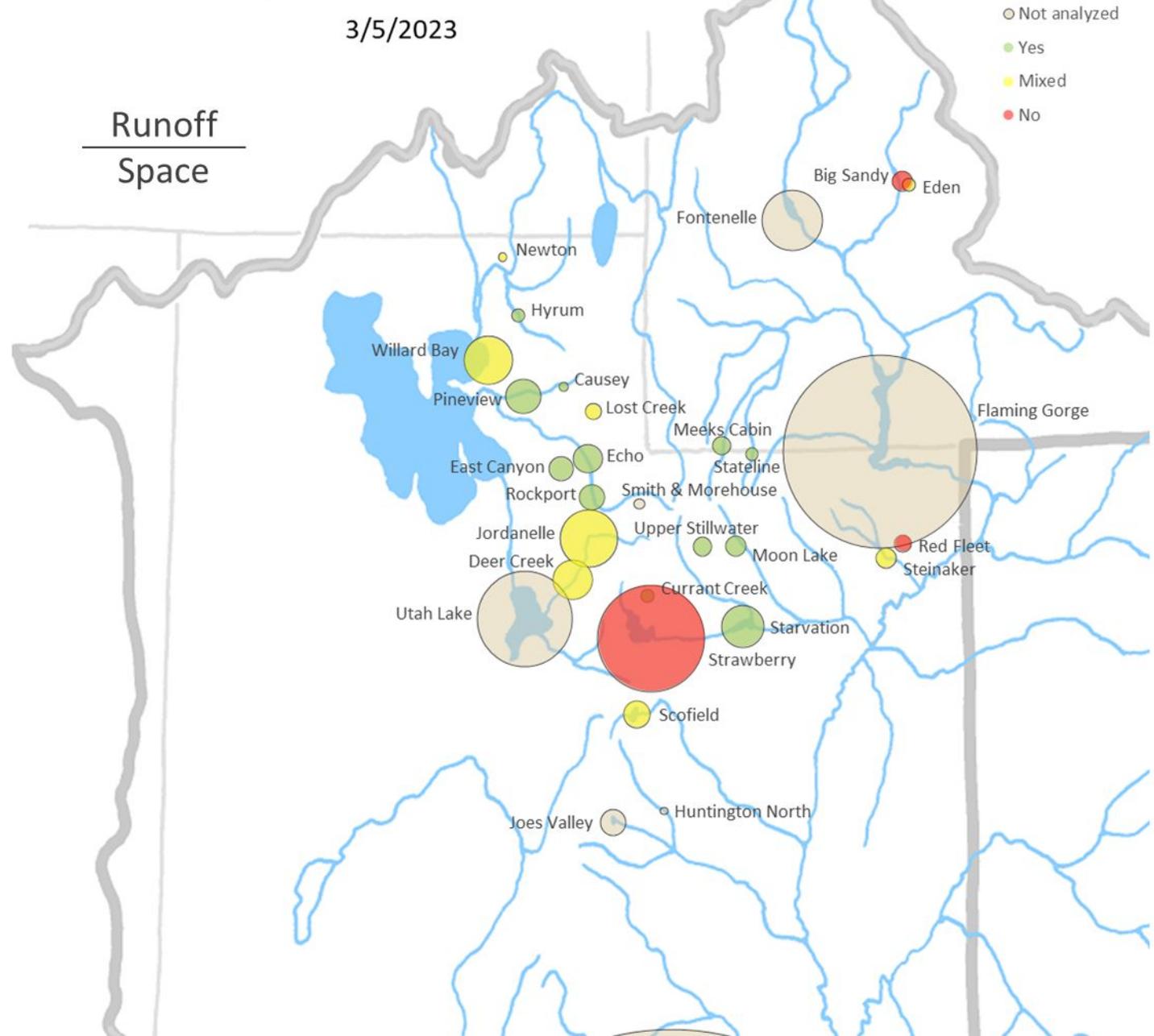
Comparing the ratio of current runoff forecast\* to reservoir space\* for this year to past years...

- Only 3 reservoirs (Strawberry, Big Sandy, and Red Fleet) have had no success filling in years with similar runoff/space conditions.
- 15 reservoirs have filled in each similar historic year.
- 8 reservoirs have historically had mixed results (filled in some similar years, didn't in others).

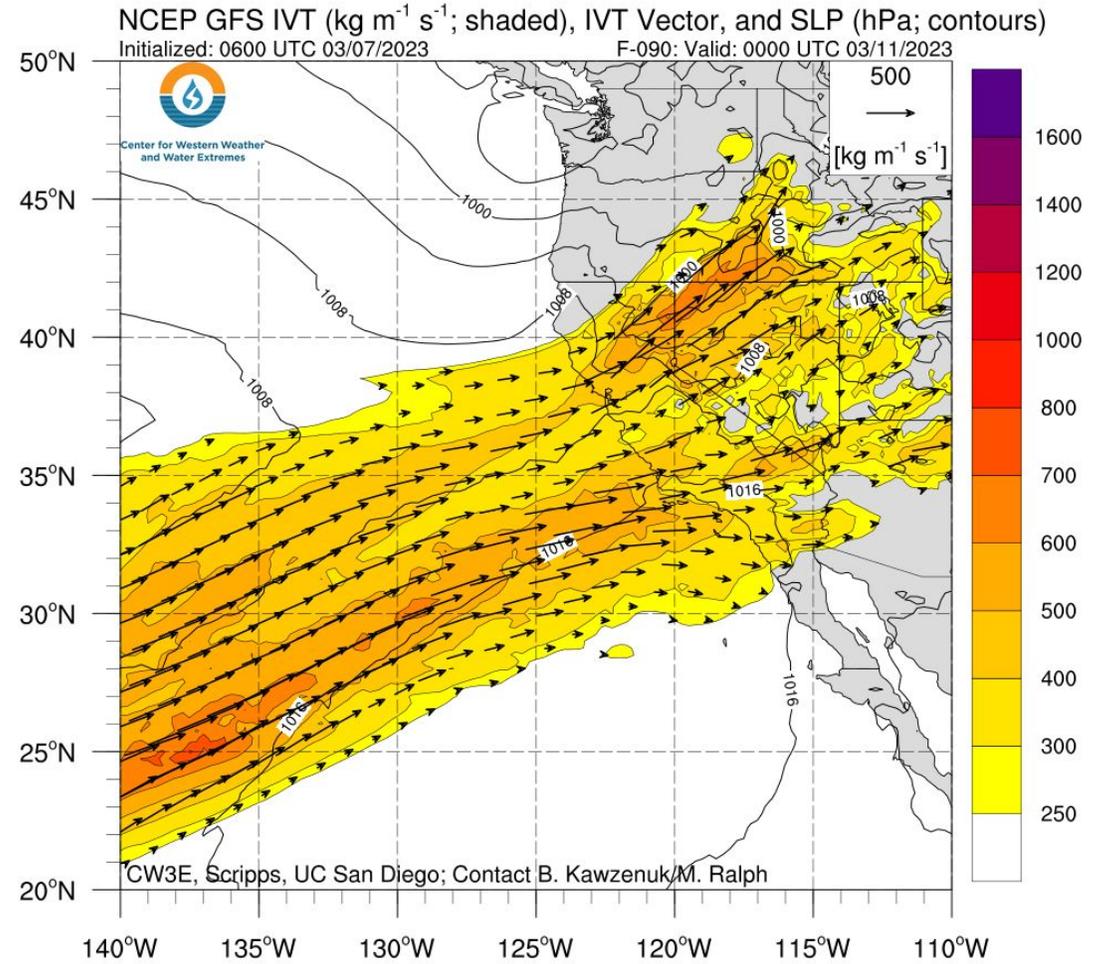
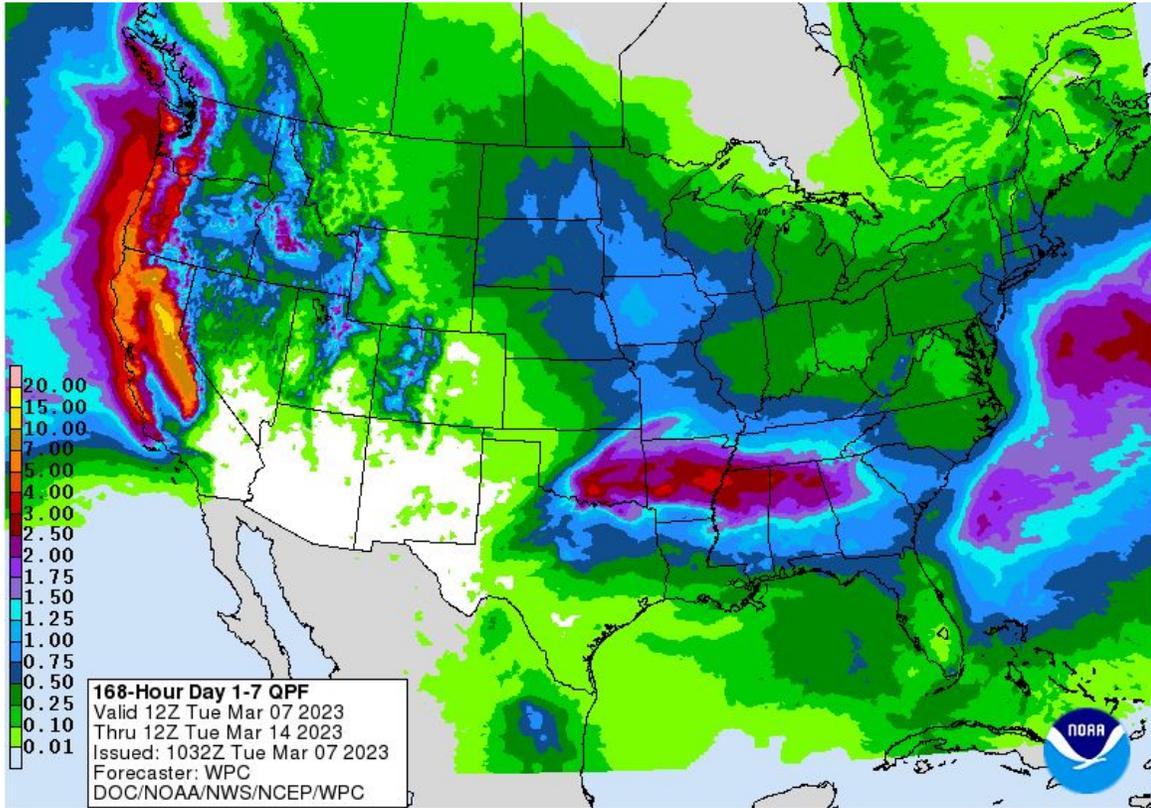
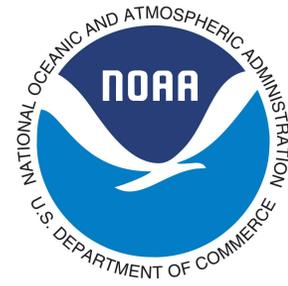
\*March 5 CBRFC ESP model guidance and March 5 reservoir empty space

## Have they filled in similar years?

3/5/2023



# Weather Forecast Office Utah Day 1-7 Outlook

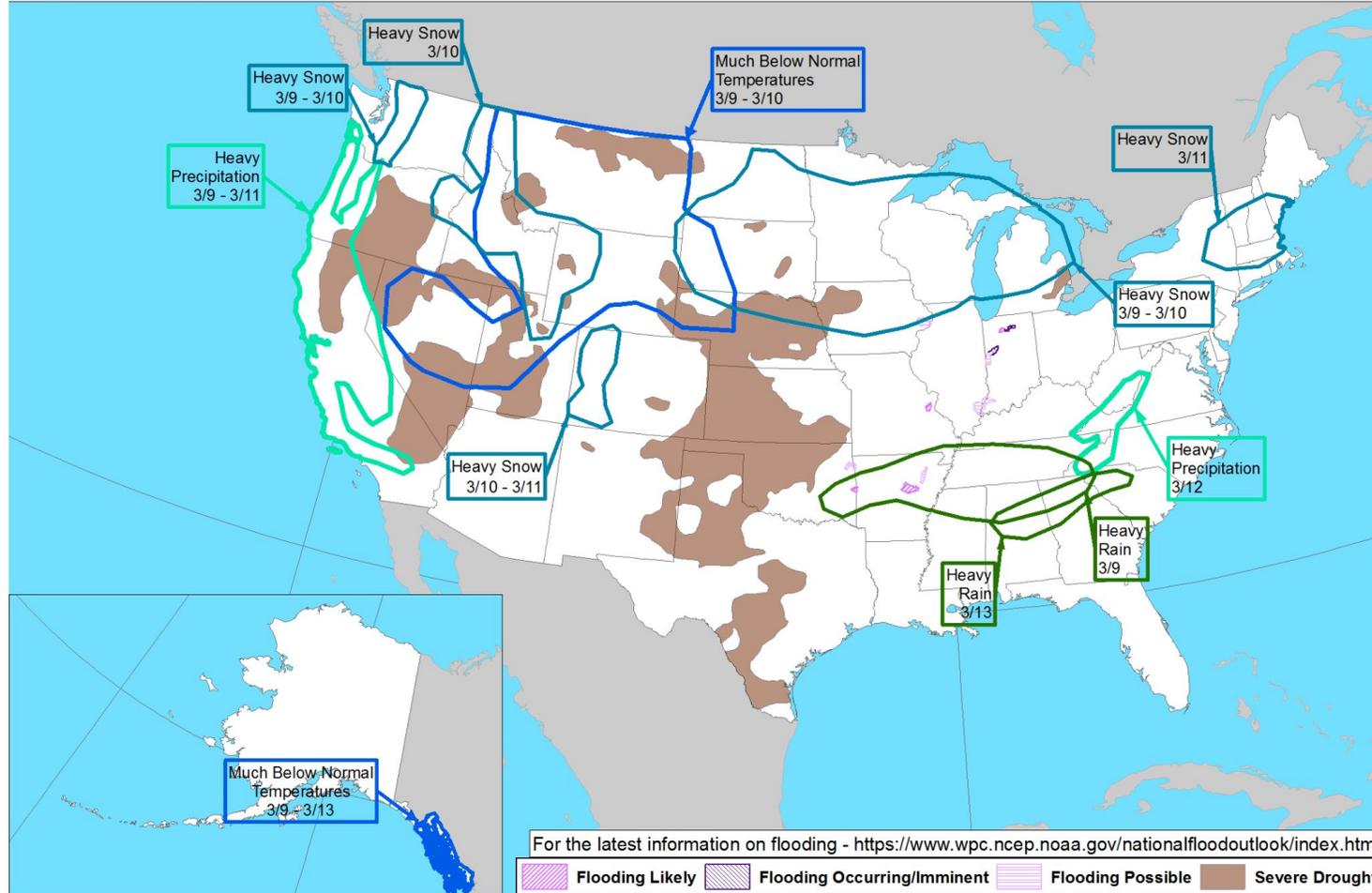


Agency - National Weather Service Weather Forecast Office  
 Presenter - Hayden Mahan

# Weather Prediction Center U.S. Day 3-7 Hazards Outlook



## Day 3-7 U.S. Hazards Outlook Valid: 03/09/2023-03/13/2023



**Weather Prediction Center**

Made: 03/06/2023 3PM EST

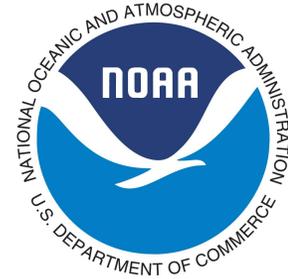
Follow us:

[www.wpc.ncep.noaa.gov](https://www.wpc.ncep.noaa.gov)

Agency - National Weather Service Weather Forecast Office

Presenter - Hayden Mahan

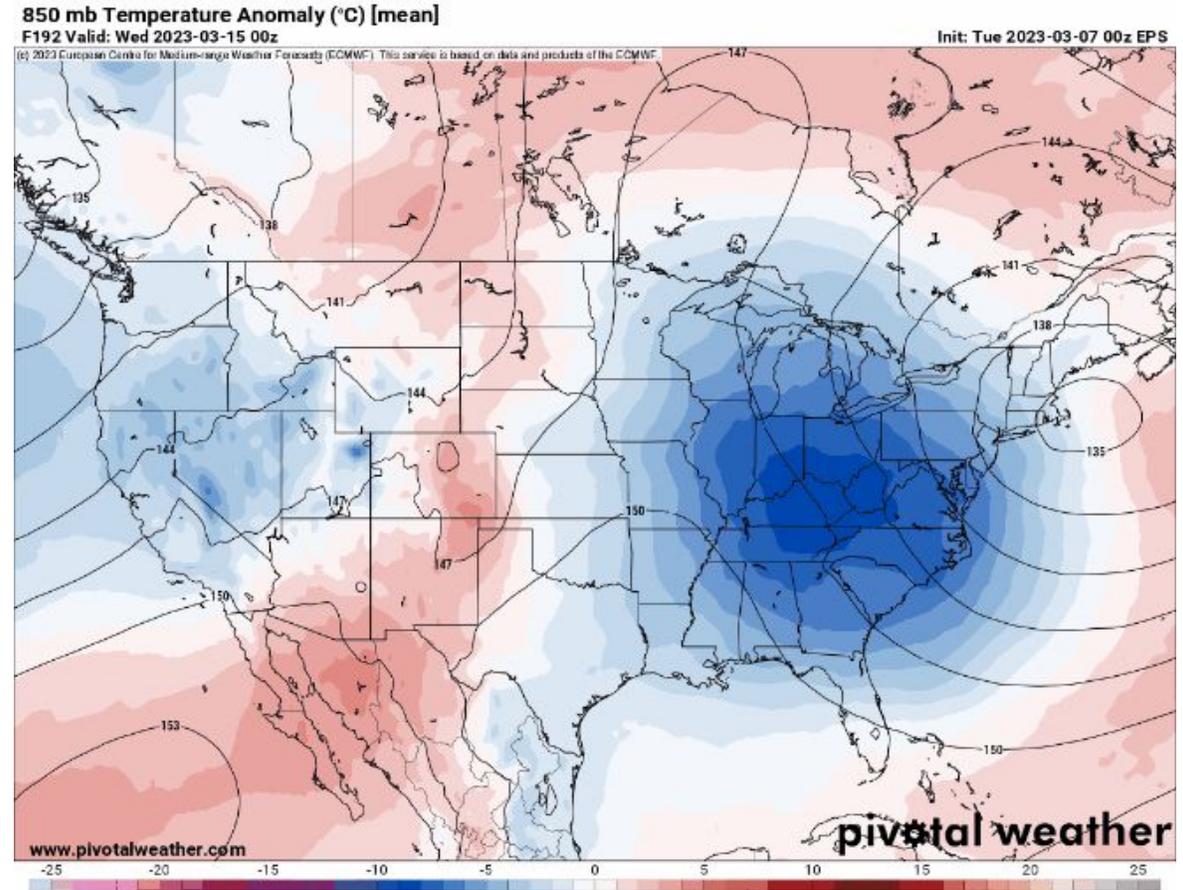
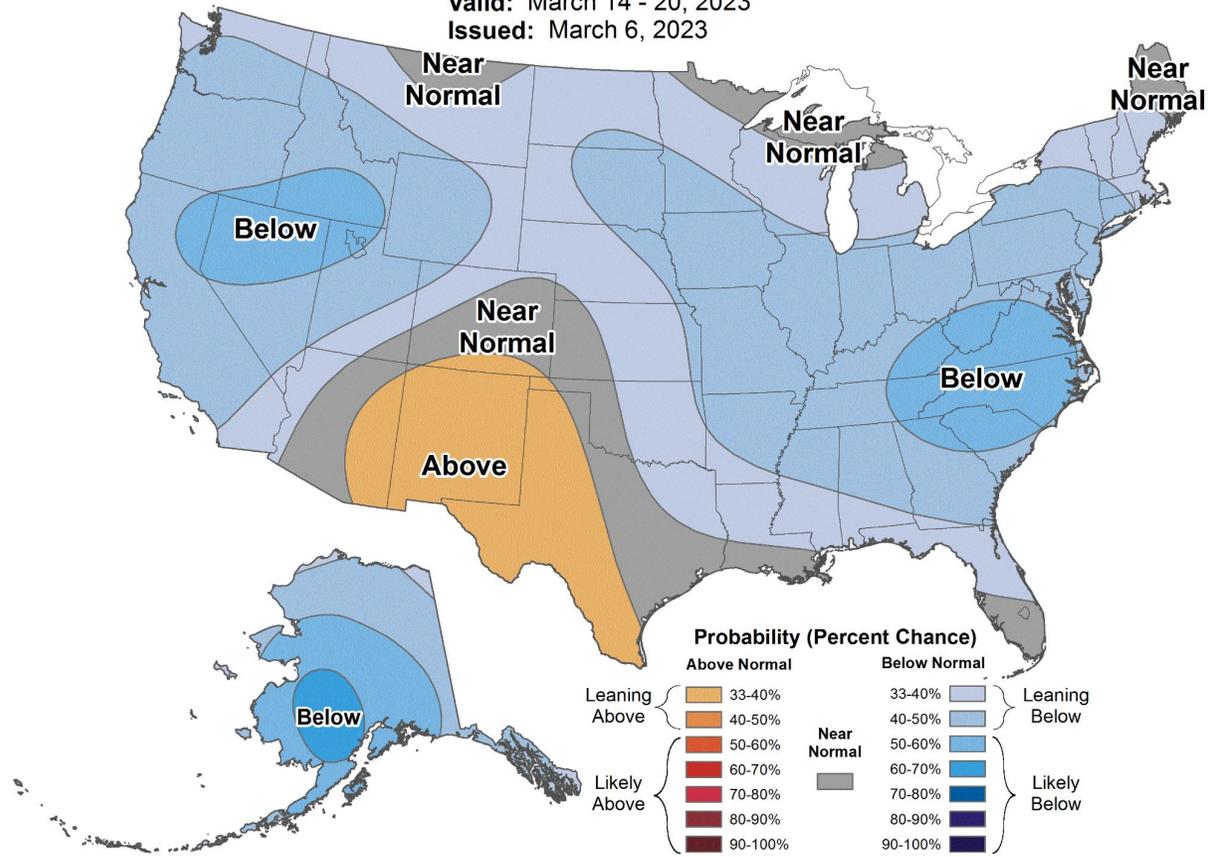
# Climate Prediction Center 8 to 14 Day Outlooks - Temperature



## 8-14 Day Temperature Outlook



Valid: March 14 - 20, 2023  
 Issued: March 6, 2023



# Climate Prediction Center 8 to 14 Day Outlooks - Precipitation

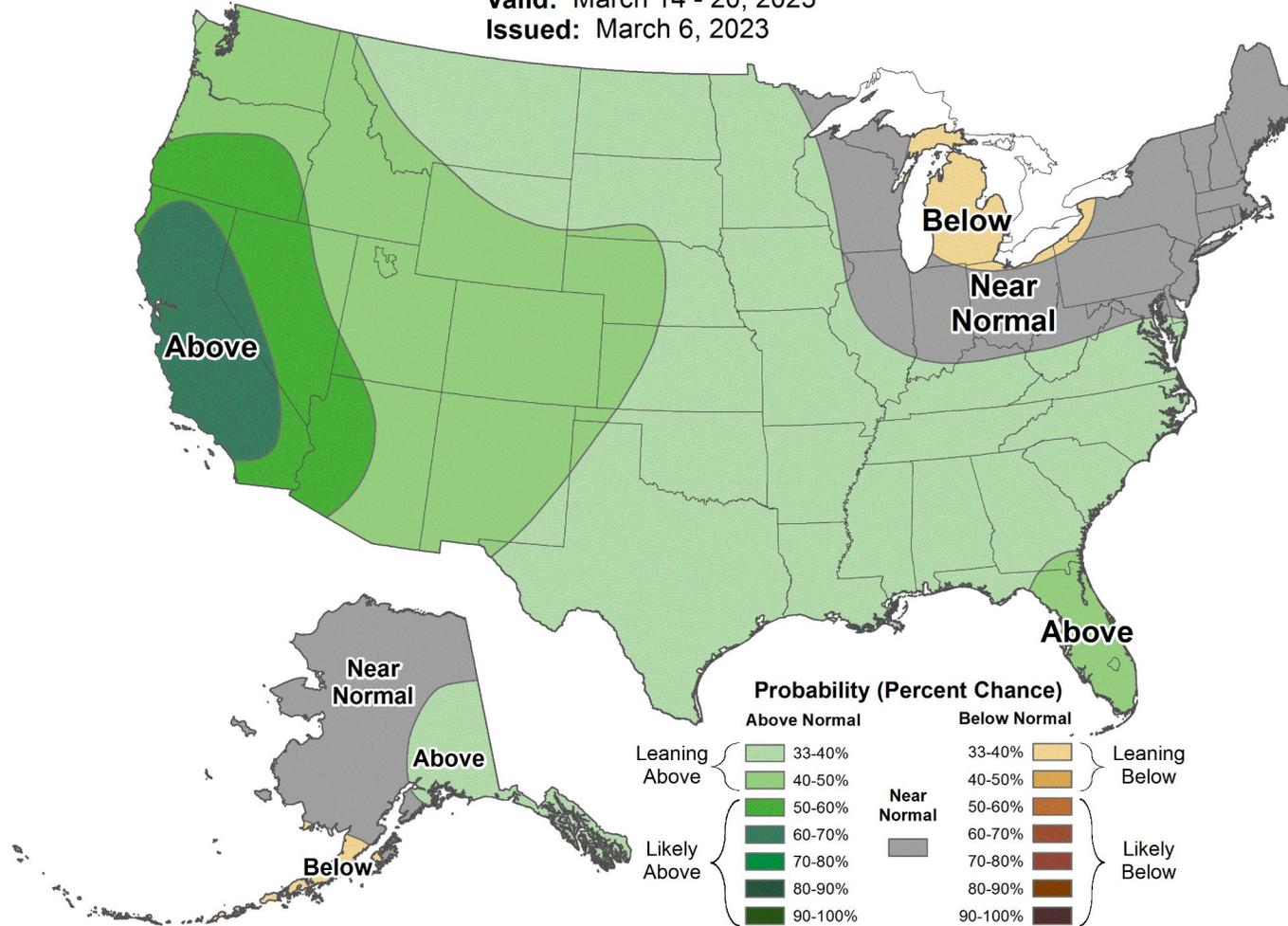


## 8-14 Day Precipitation Outlook



Valid: March 14 - 20, 2023

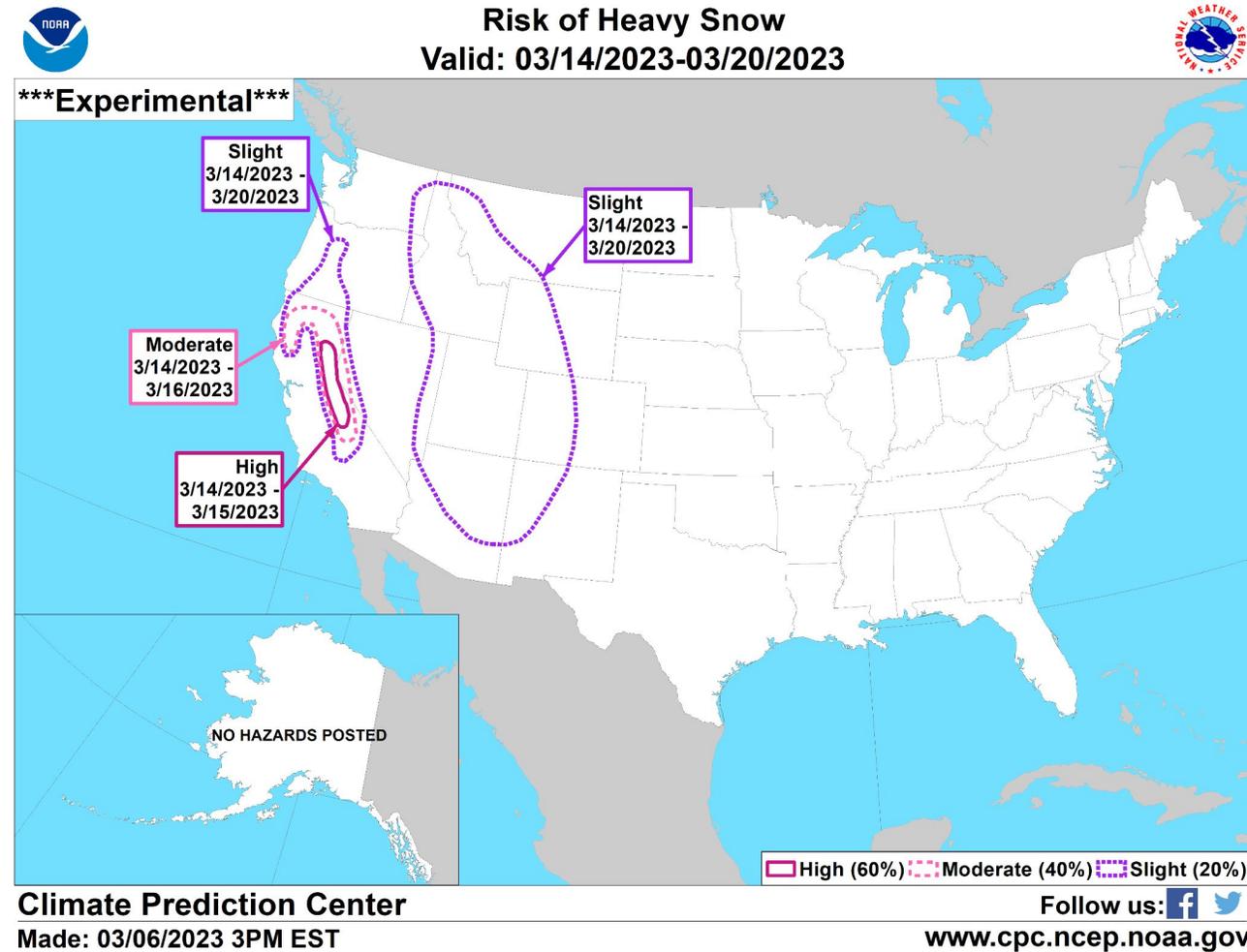
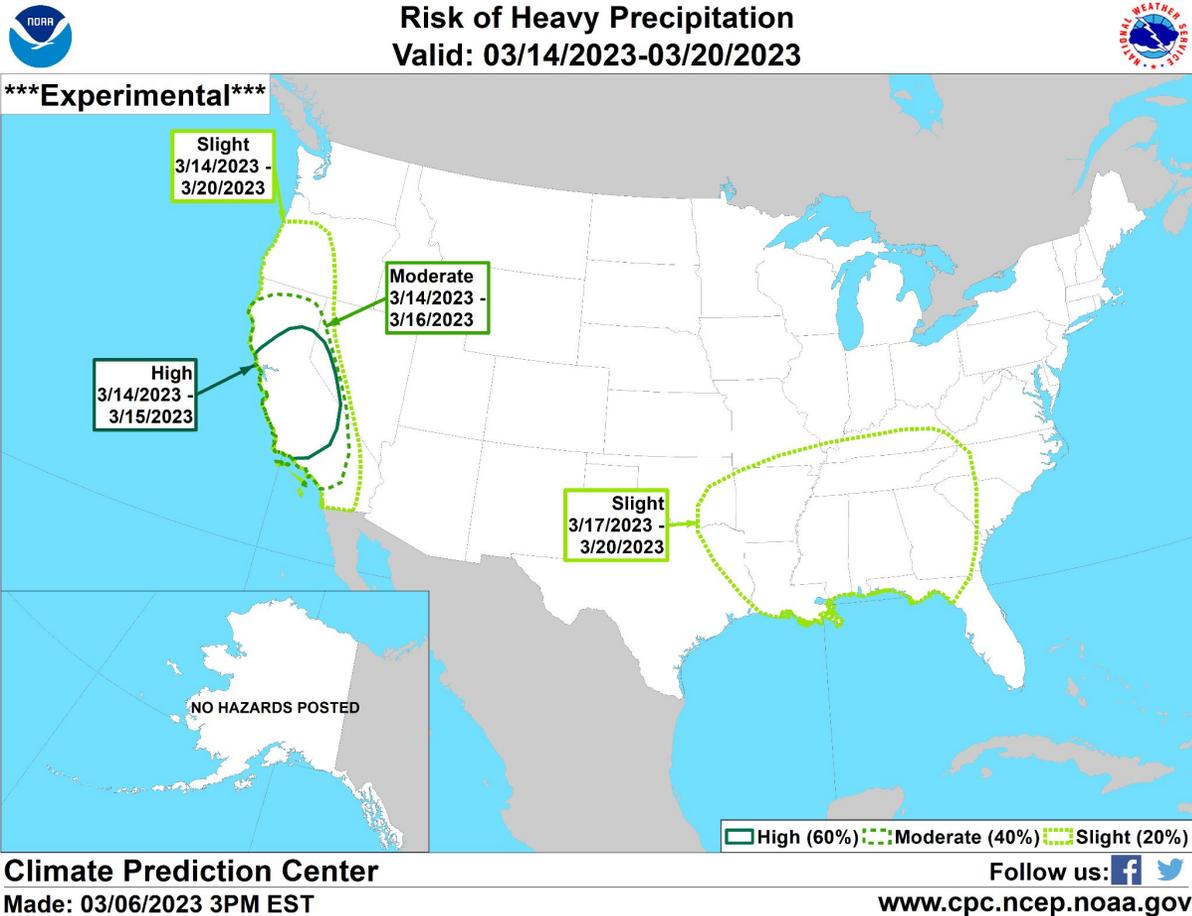
Issued: March 6, 2023



Agency - National Weather Service Weather Forecast Office

Presenter - Hayden Mahan

# Climate Prediction Center U.S. Week-2 Hazards Outlook

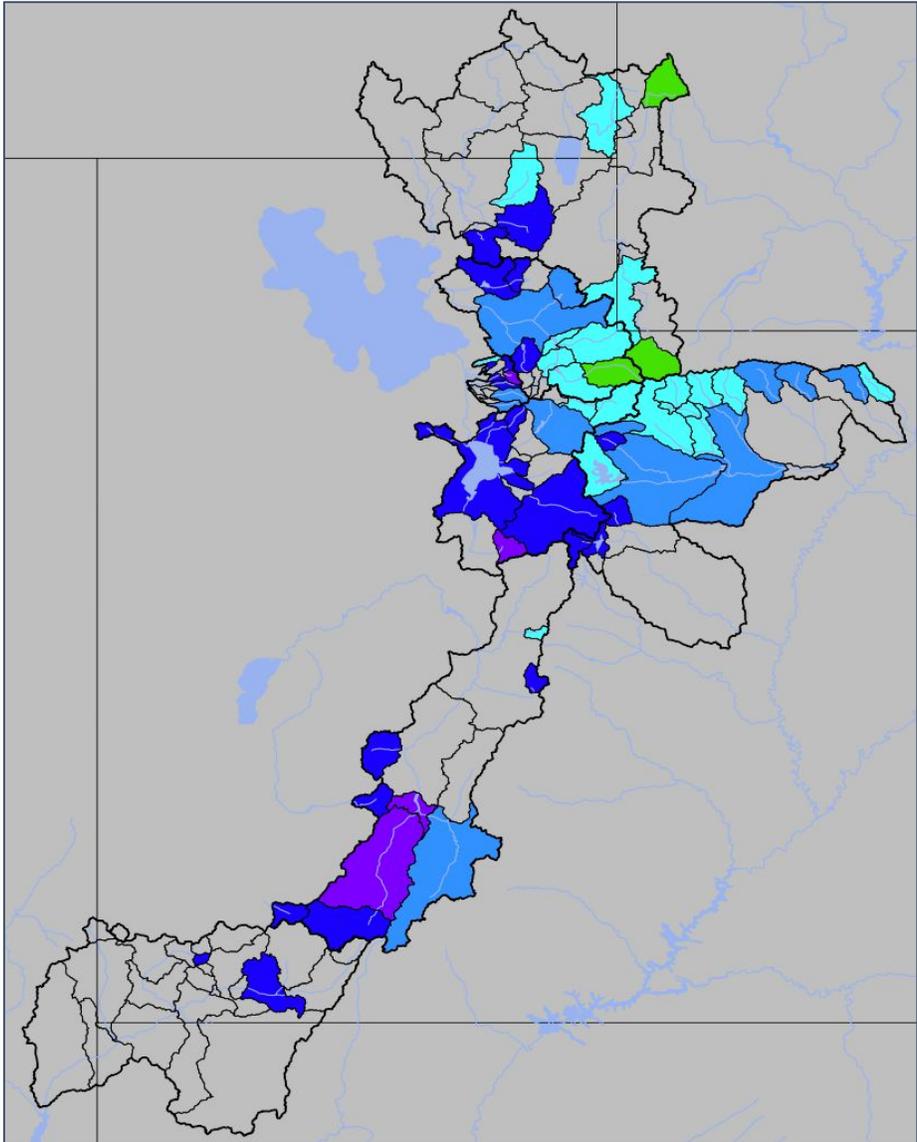


# Utah Water Supply Forecasts



Percent of Average

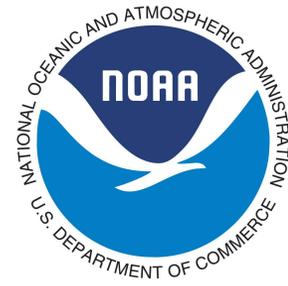
- < 30%
- 30-50%
- 50-70%
- 70-90%
- 90-100%
- 100-110%
- 110-130%
- 130-150%
- 150-200%
- 200-300%
- 300-500%
- >500%



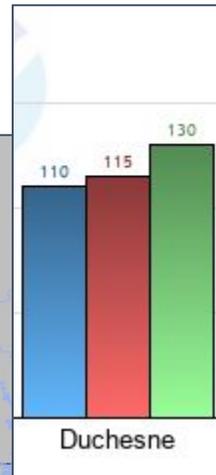
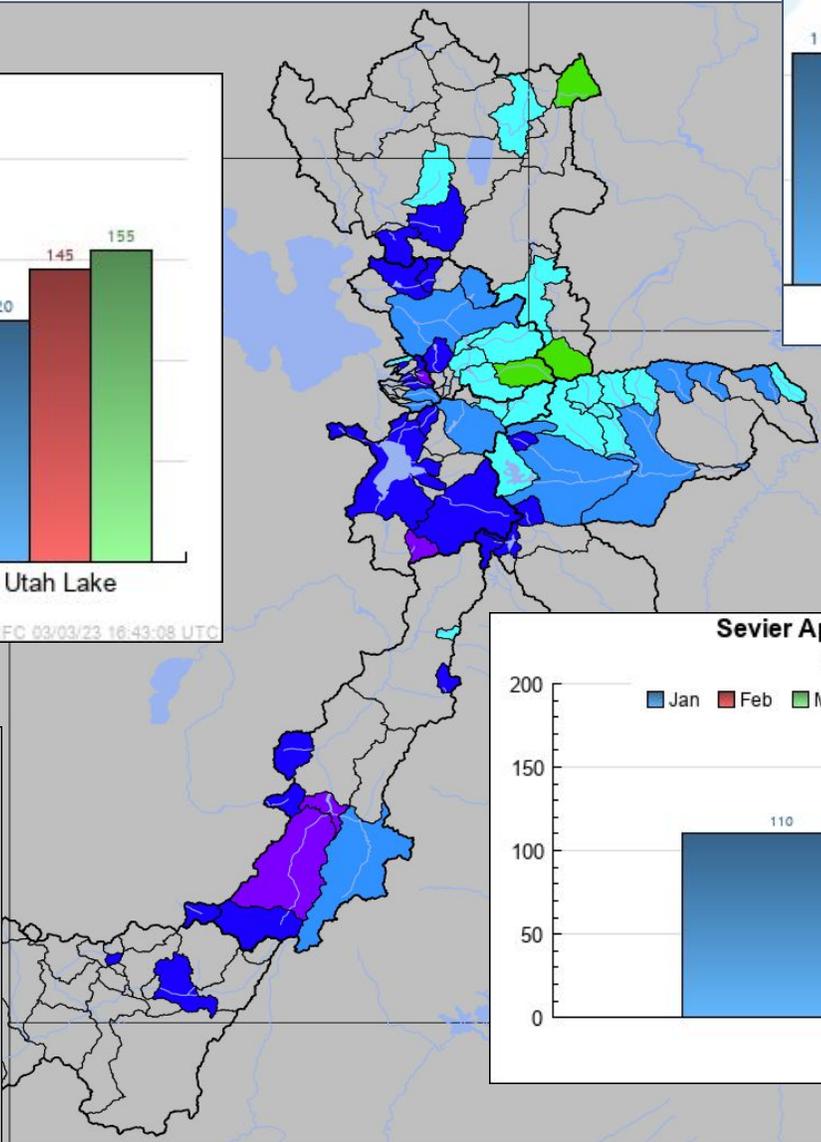
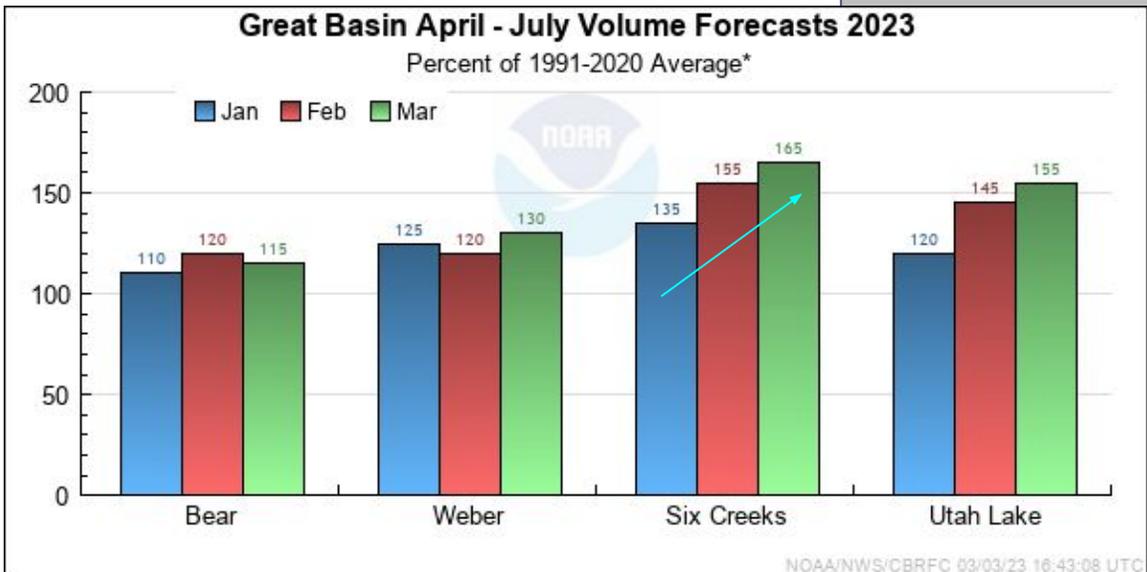
- March 1 forecast for April-July volume
- April-July forecast streamflow volumes are in percent of 1991-2020 average.

Median forecasts by forecast group.

Bear	115%
Weber	130%
Six Creeks	165%
Provo / Utah Lake	155%
Sevier	160%
Duchesne	130%
Virgin	175%

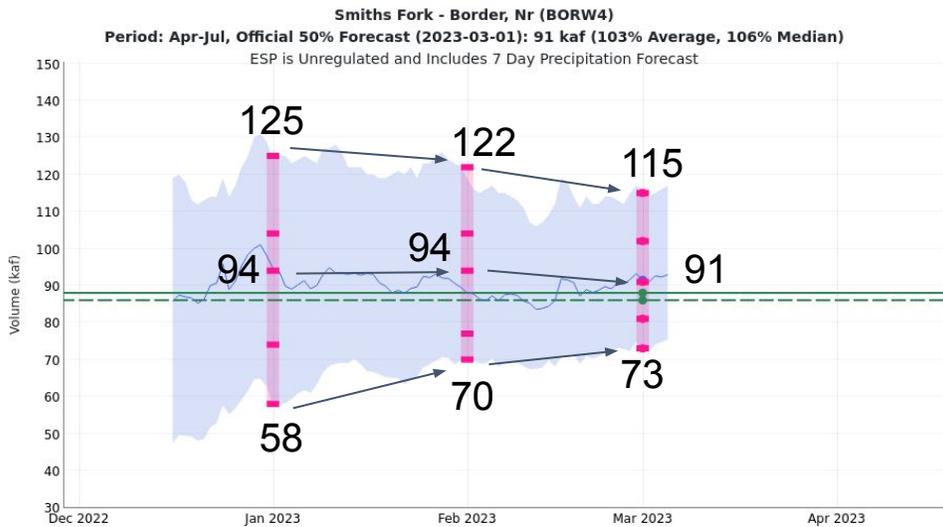


# Utah Water Supply Forecasts since January 1



Forecasts have generally increased in response to above average precipitation and snowpack accumulation.

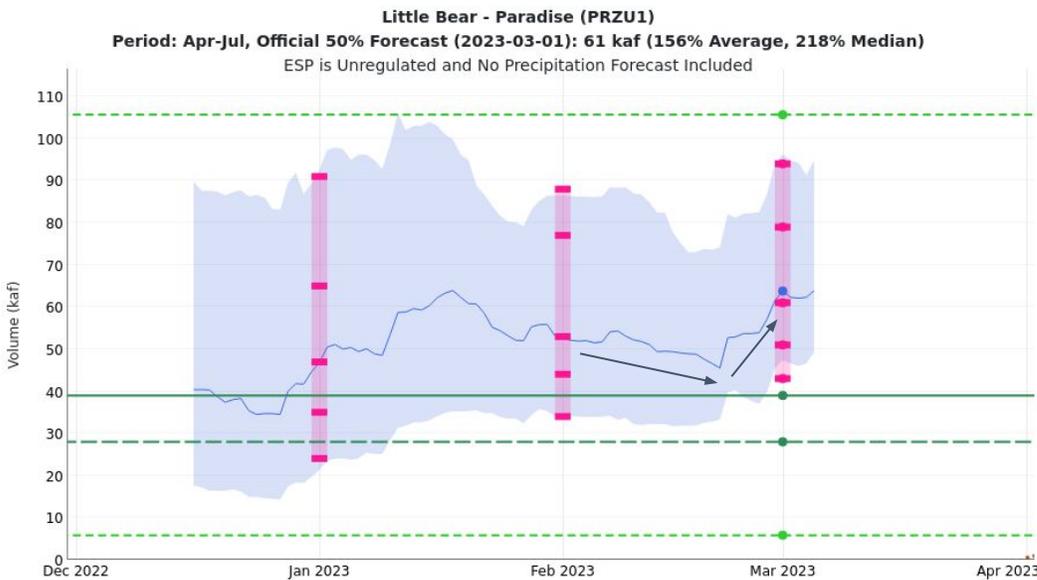
# Utah Water Supply Forecasts - Bear



2023/03/01:  
**Max 1986:** 180.79  
**Min 1977:** 20.27  
**Average:** 88  
**Median:** 86  
**ESP:** 91.5  
**Official 10:** 115  
**Official 30:** 102  
**Official 50:** 91  
**Official 70:** 81  
**Official 90:** 73

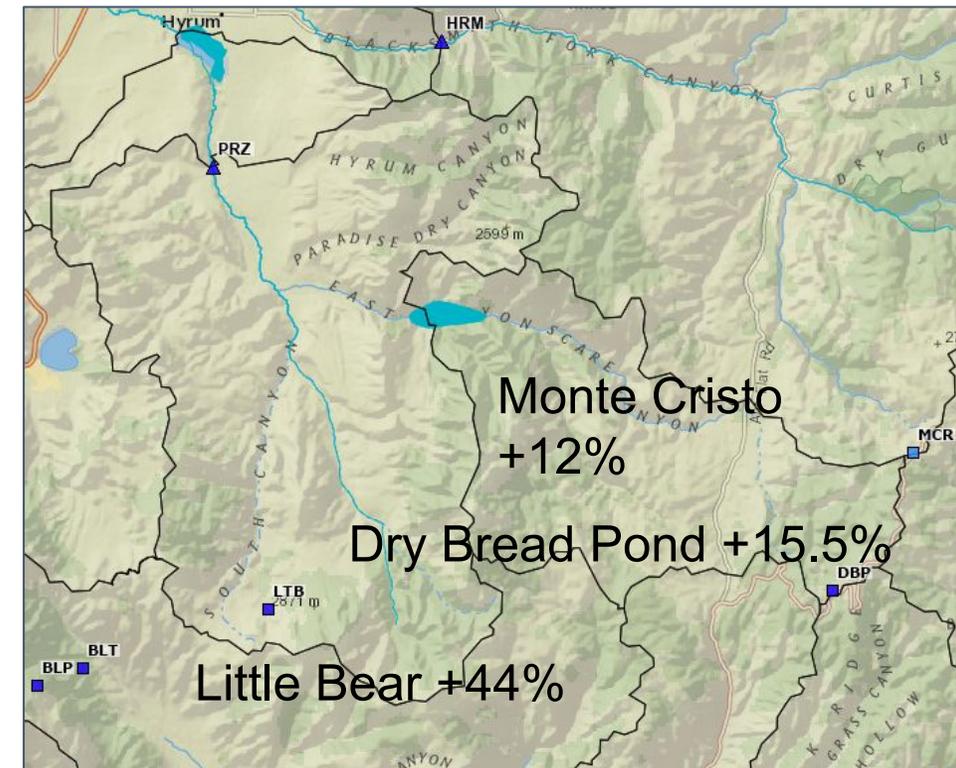
## Evolution Plots

- “Evolve” with model states over time
  - Above average precipitation should move forecasts up.
  - Future weather variability decreases with time.

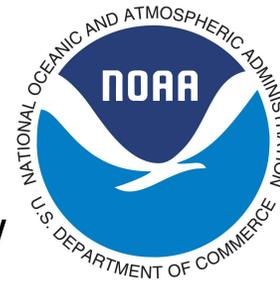


2023/03/01:  
**Max 2011:** 105.64  
**Min 2021:** 5.83  
**Average:** 39  
**Median:** 28  
**ESP:** 63.8  
**Official 10:** 94  
**Official 30:** 79  
**Official 50:** 61  
**Official 70:** 51  
**Official 90:** 43

## Change in % daily median Feb. 22-28



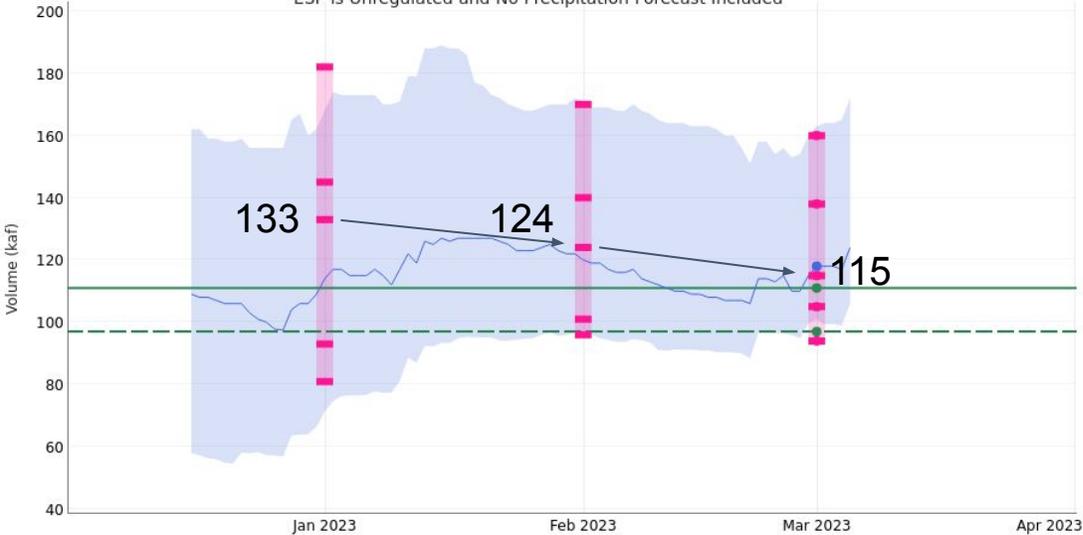
# Utah Water Supply Forecasts - Weber



**Weber - Oakley, Nr (OAWU1)**  
 Period: Apr-Jul, Official 50% Forecast (2023-03-01): 115 kaf (104% Average, 119% Median)  
 ESP is Unregulated and No Precipitation Forecast Included

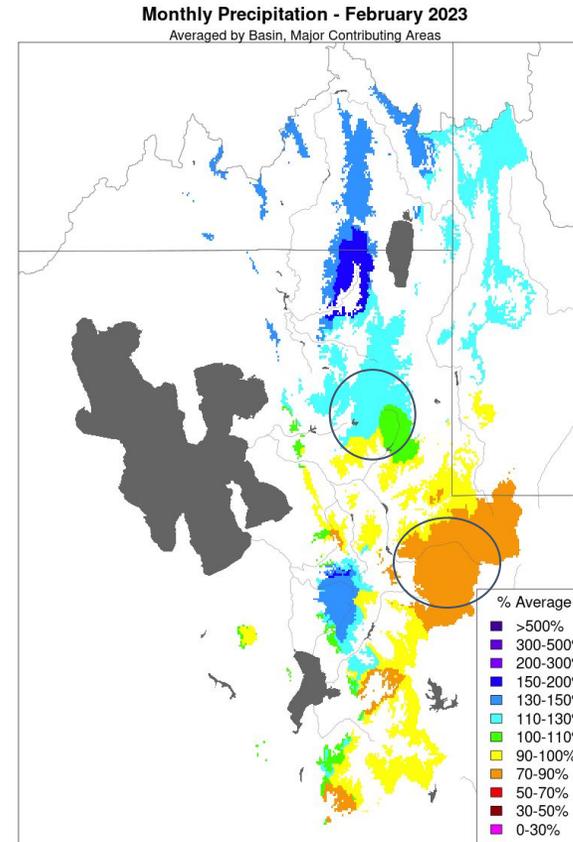
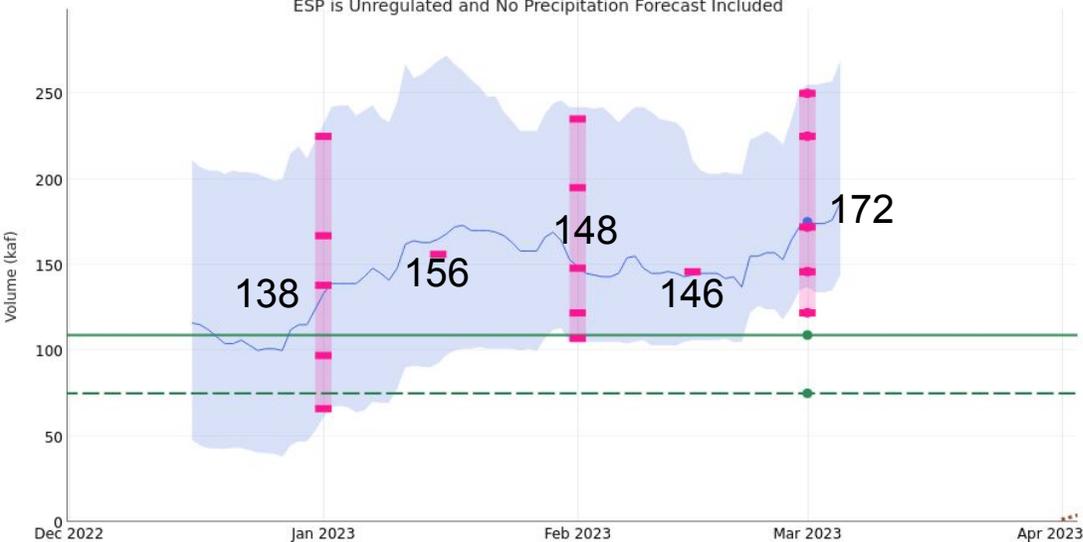
2023/03/01:  
**Average:** 111  
**Median:** 97  
**ESP:** 118  
**Official 10:** 160  
**Official 30:** 138  
**Official 50:** 115  
**Official 70:** 105  
**Official 90:** 94

• Uinta Headwaters have received below normal precipitation for February  
 • Ogden, Lost Creek have received above normal precipitation for February



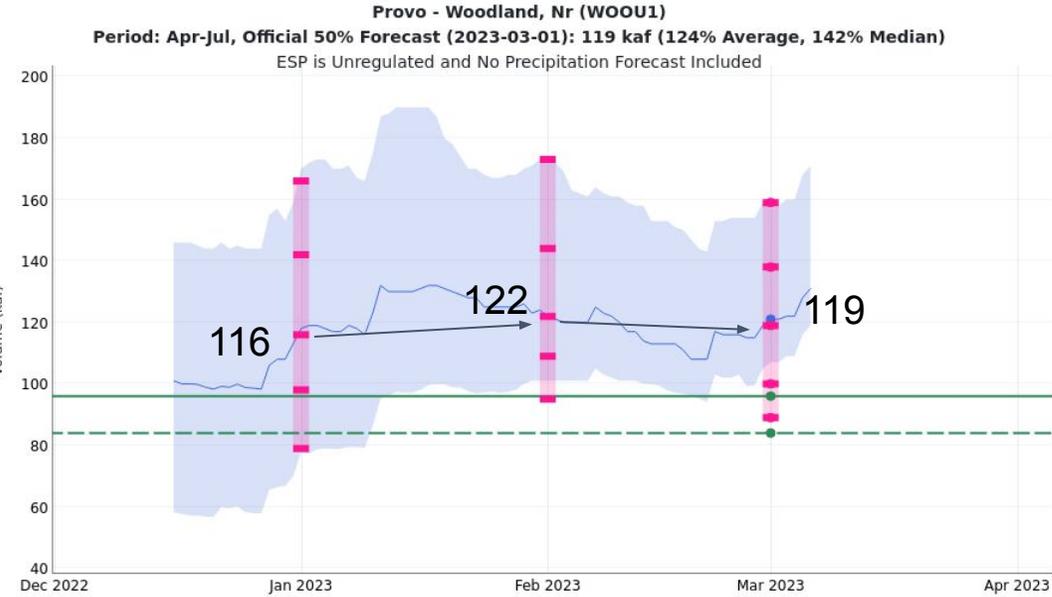
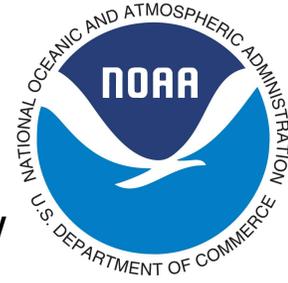
**Ogden - Pineview Reservoir, Ogden, Nr (PINU1)**  
 Period: Apr-Jul, Official 50% Forecast (2023-03-01): 172 kaf (158% Average, 229% Median)  
 ESP is Unregulated and No Precipitation Forecast Included

2023/03/01:  
**Average:** 109  
**Median:** 75  
**ESP:** 175  
**Official 10:** 250  
**Official 30:** 225  
**Official 50:** 172  
**Official 70:** 146  
**Official 90:** 122



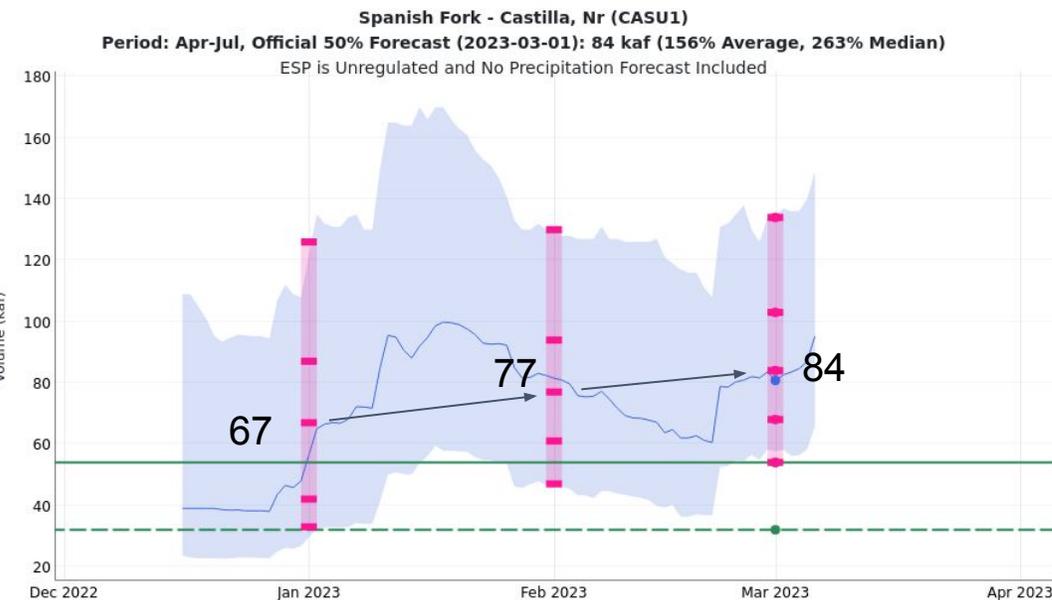
Prepared by NOAA, Colorado Basin River Forecast Center  
 Salt Lake City, Utah, [www.cbrfc.noaa.gov](http://www.cbrfc.noaa.gov)

# Utah Water Supply Forecasts - Provo - Utah Lake Basin

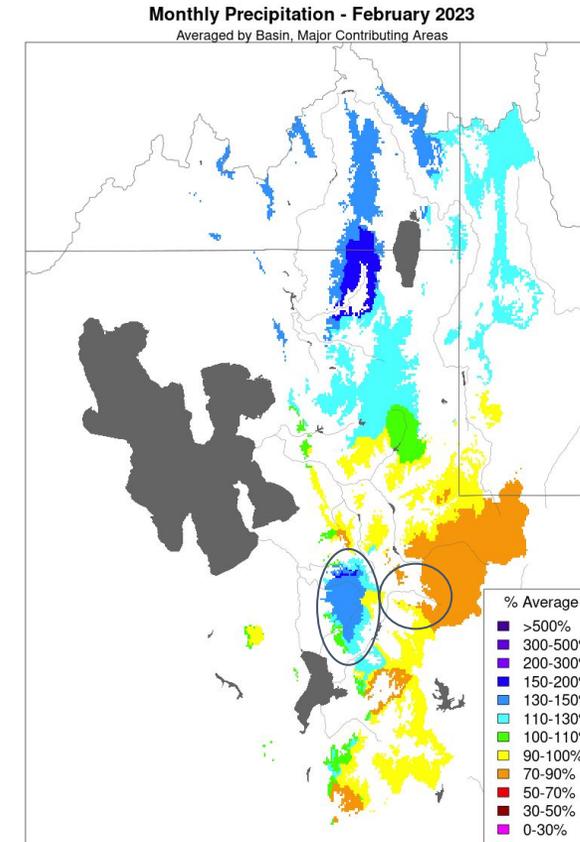


2023/03/01:  
**Average:** 96  
**Median:** 84  
**ESP:** 121  
**Official 10:** 159  
**Official 30:** 138  
**Official 50:** 119  
**Official 70:** 100  
**Official 90:** 89

• Uinta Headwaters have received below normal precipitation for February  
 • Spanish Fork and American Fork have received above normal precipitation

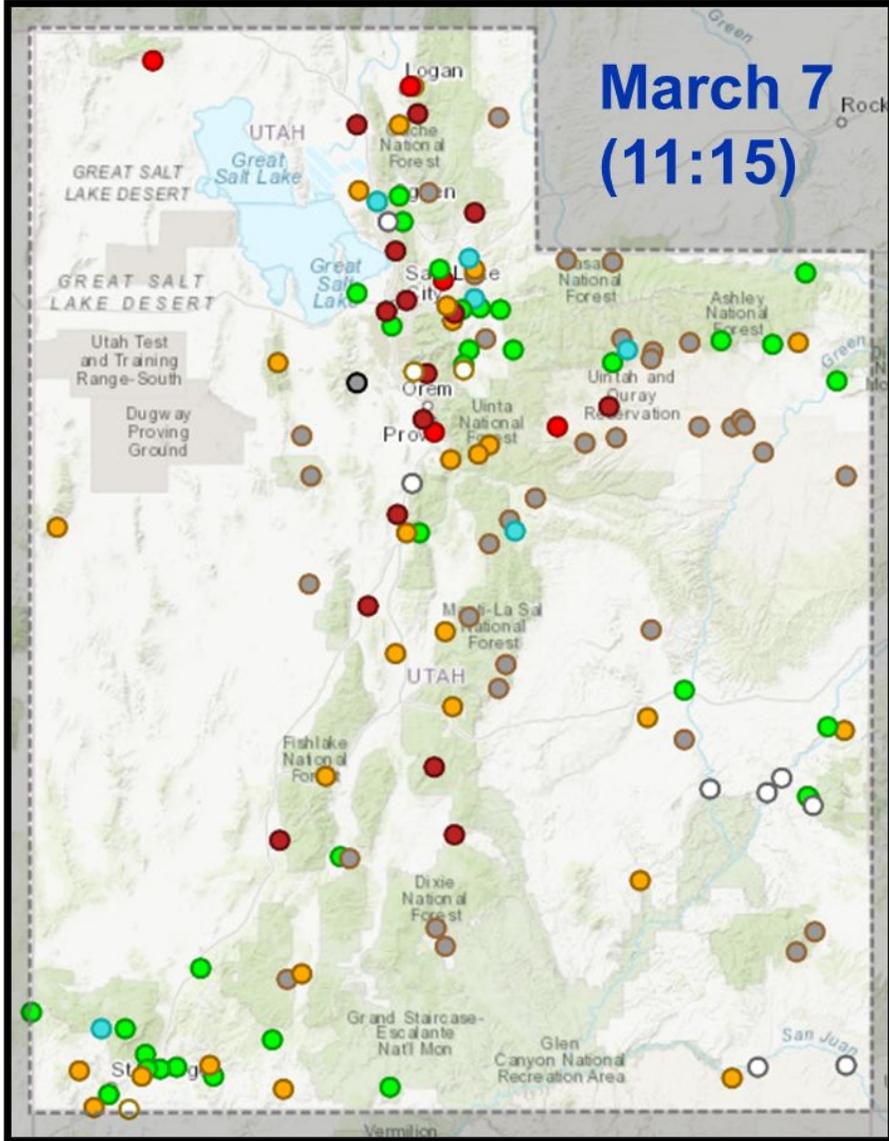


2023/03/01:  
**Average:** 54  
**Median:** 32  
**ESP:** 80.8  
**Official 10:** 134  
**Official 30:** 103  
**Official 50:** 84  
**Official 70:** 68  
**Official 90:** 54



# Current Streamflow Conditions

Feb 21    Mar 7



National Water Dashboard

Provisional data, subject to revision

\*Sites must have at least 10 years of streamflow record to be ranked on this graphic

Day-of-Year Status	% Gages	% Gages
All-time high for this day-of-year	0.0%	0.0%
Much above normal for this day-of-year	0.0%	0.0%
Above normal for this day-of-year	7.3%	4.4%
Normal for this day-of-year	27.0%	27.0%
Below normal for this day-of-year	15.3%	19.0%
Much below normal for this day-of-year	5.8%	10.9%
All-time low for this day-of-year	1.5%	3.6%
Not ranked - insufficient record	8.0%	7.3%
Not ranked - no recent measurement	28.5%	2.9%
Not ranked - no measurement	2.9%	22.6%
Not ranked - stream not flowing	3.6%	2.2%

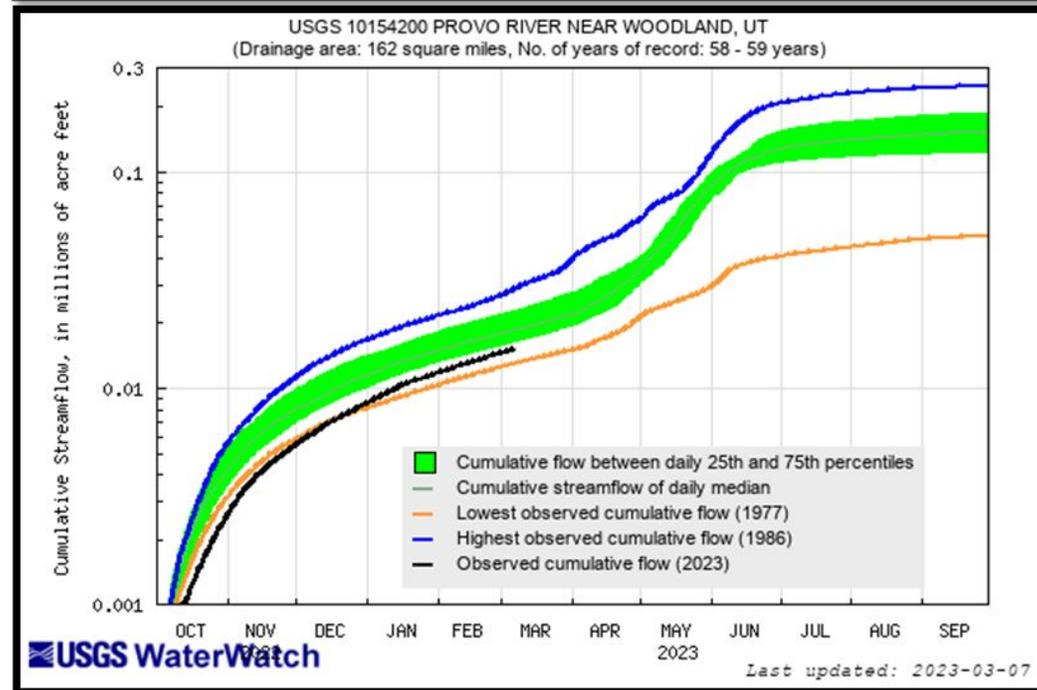
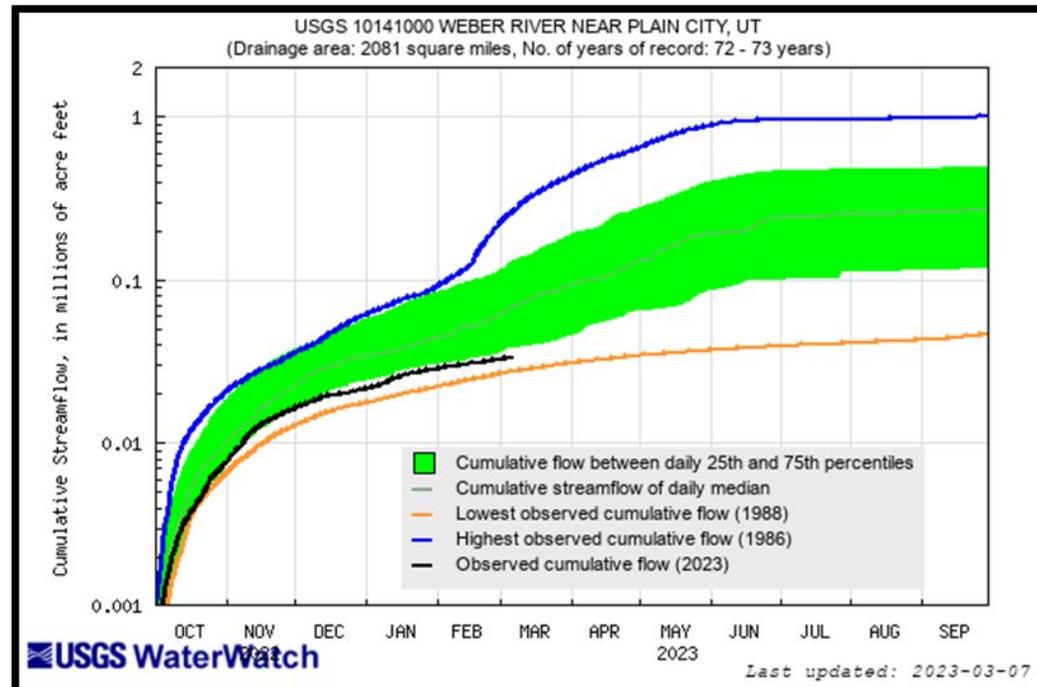
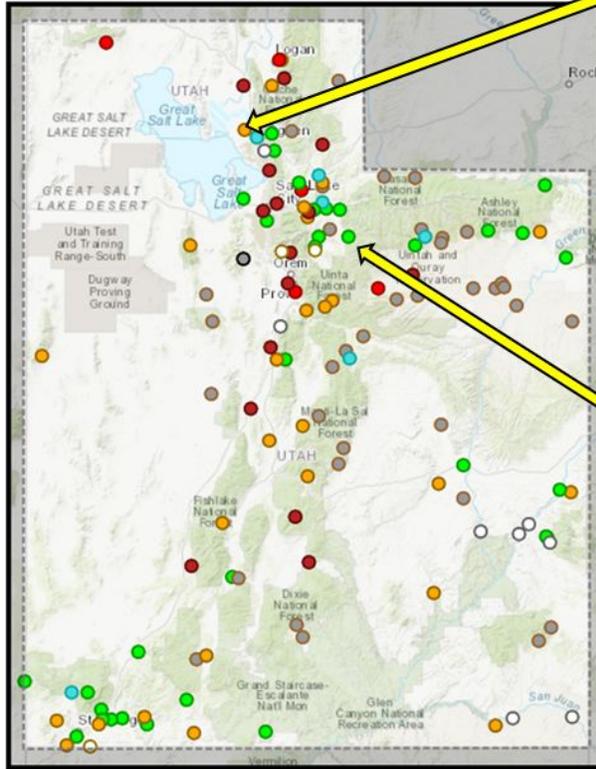
**Streamflow: Status**

- Above flood stage
- All-time high for this day (100<sup>th</sup> percentile (maximum))
- Much above normal (>90<sup>th</sup> percentile)
- Above normal (76<sup>th</sup> - 90<sup>th</sup> percentile)
- Normal (25<sup>th</sup> - 75<sup>th</sup> percentile)
- Below normal (10<sup>th</sup> - 24<sup>th</sup> percentile)
- Much below normal (<10<sup>th</sup> percentile)
- All-time low for this day (0<sup>th</sup> percentile (minimum))
- Not flowing
- Not ranked
- Measurement flag
- Recent measurement unavailable

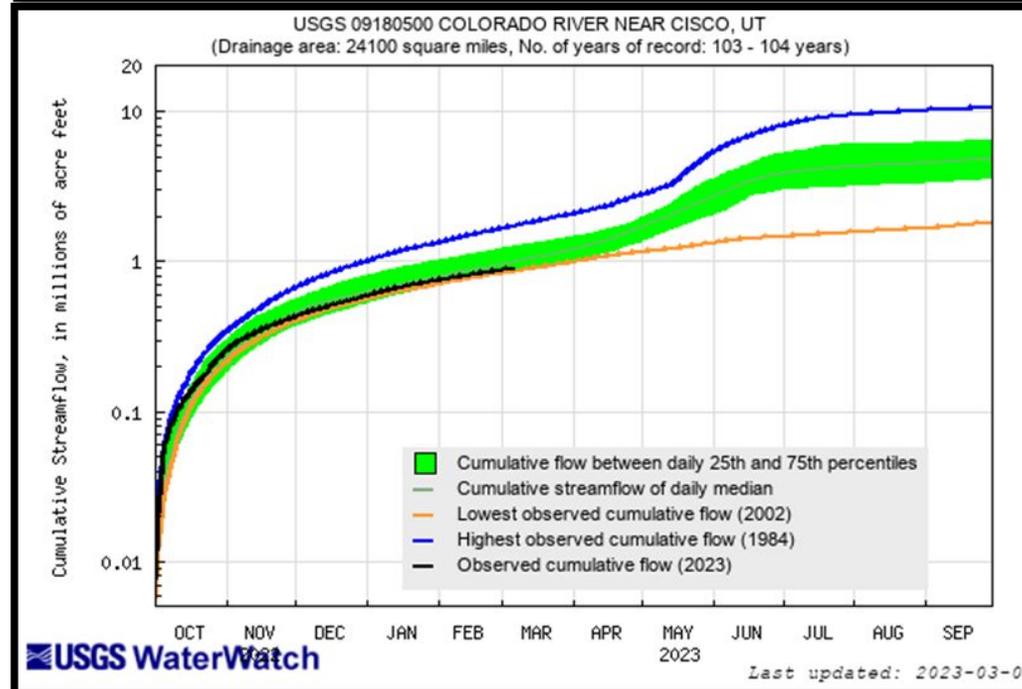
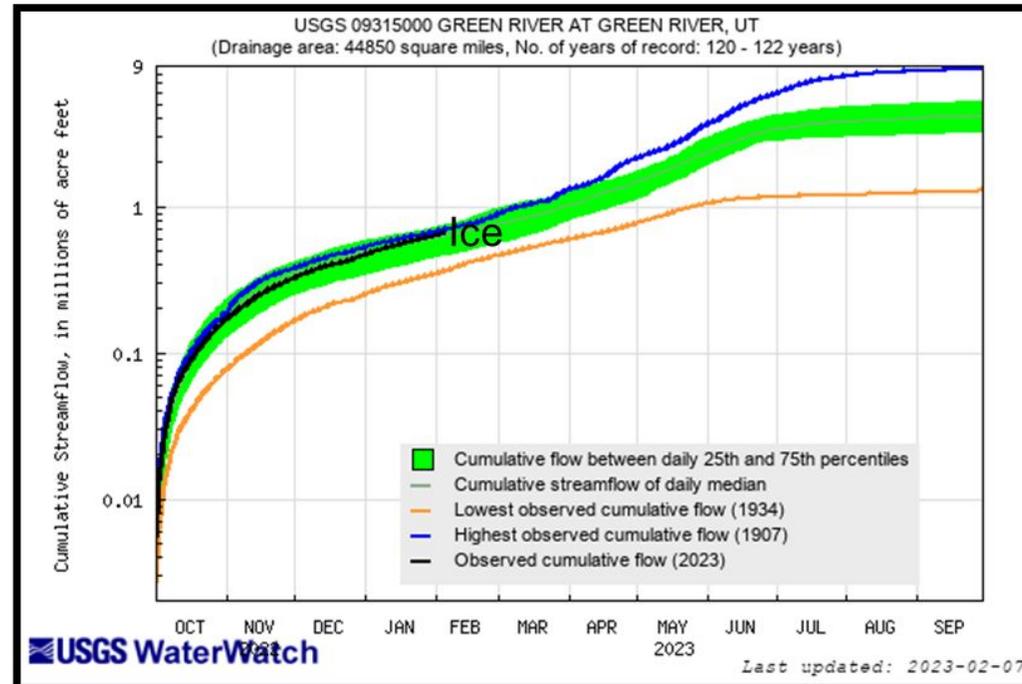
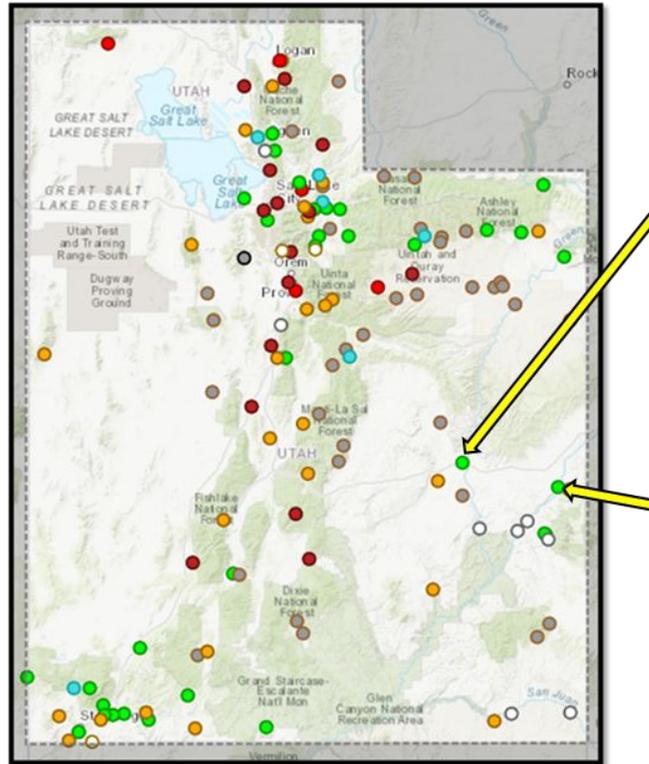
Agency - USGS Utah WSC  
 Presenter - Ryan Rowland



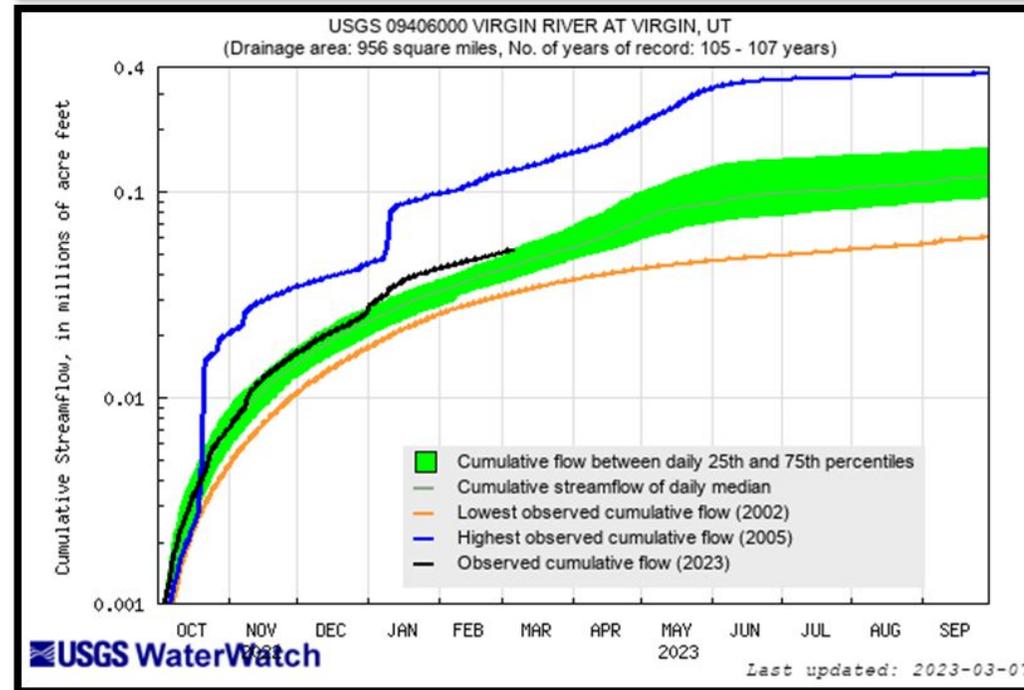
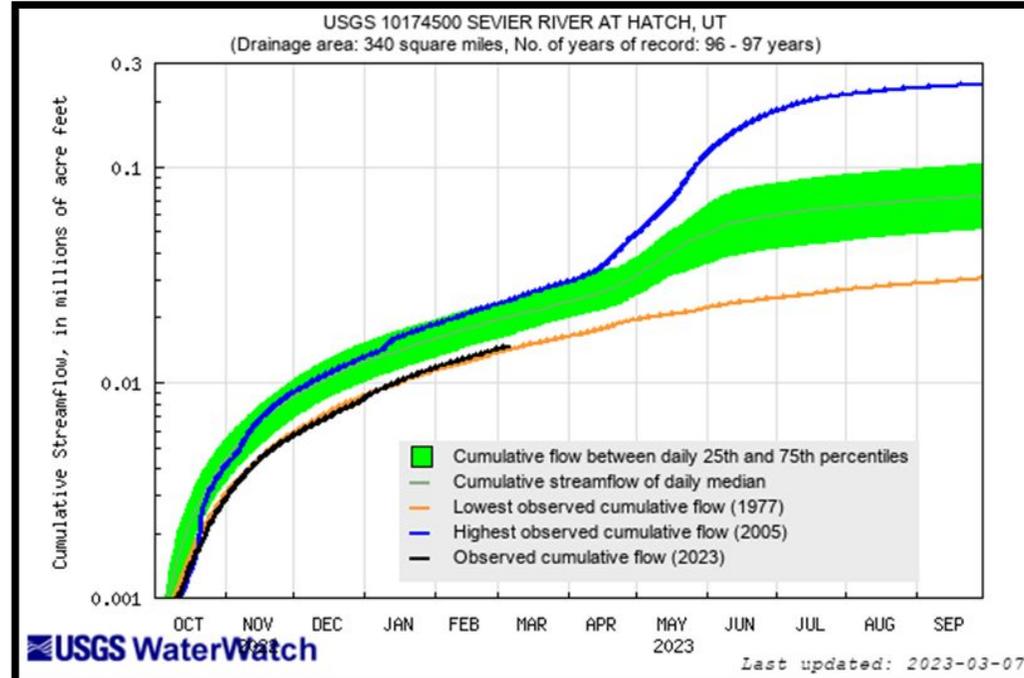
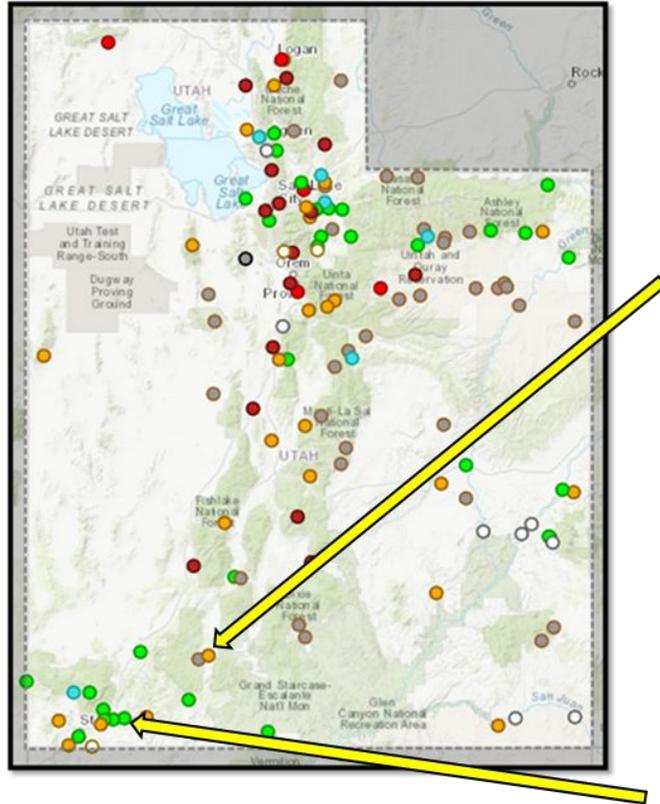
# Streamflow at Selected Gages



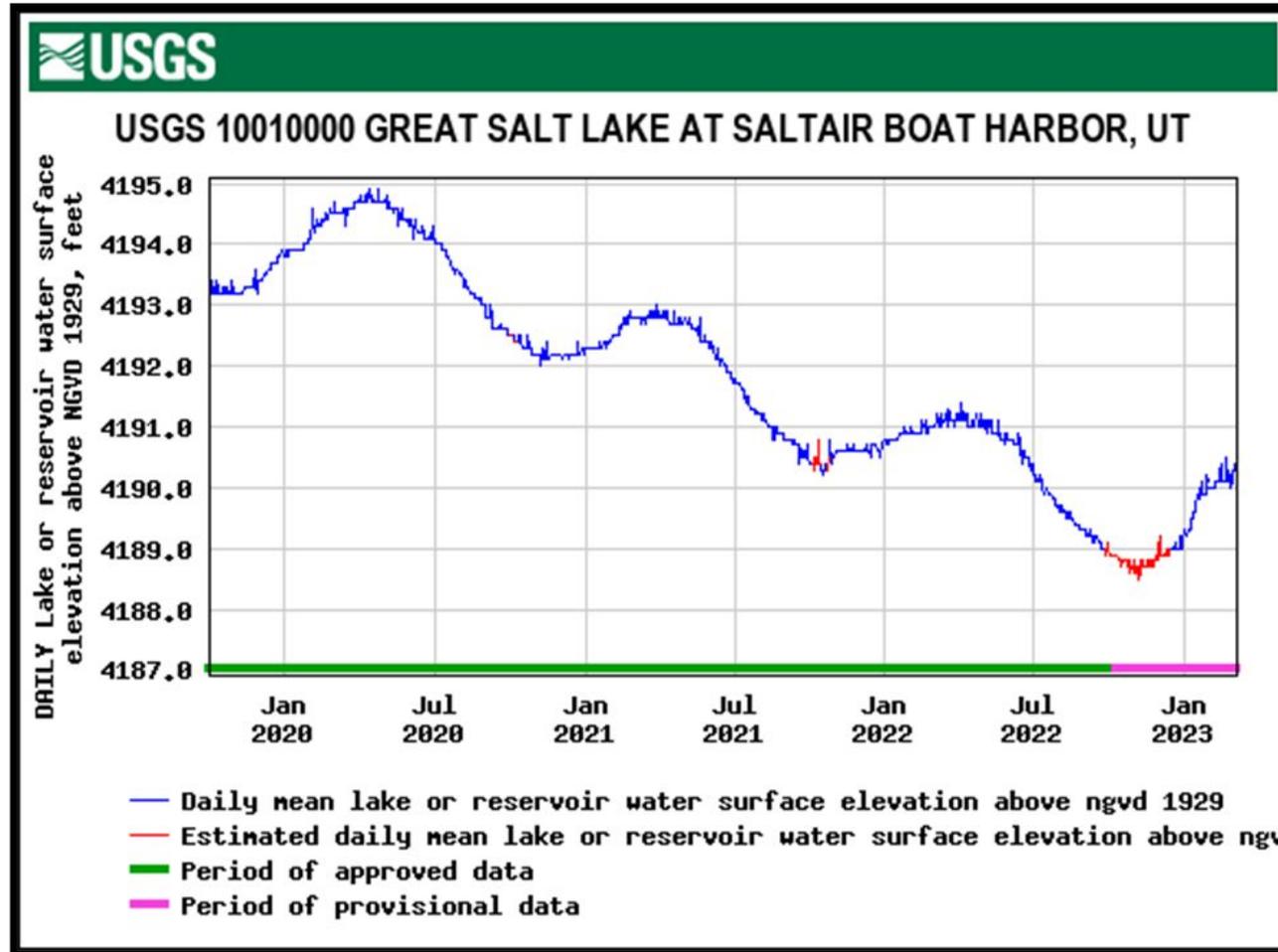
# Streamflow at Selected Gages



# Streamflow at Selected Gages



# Great Salt Lake Water Surface Elevation – South Arm

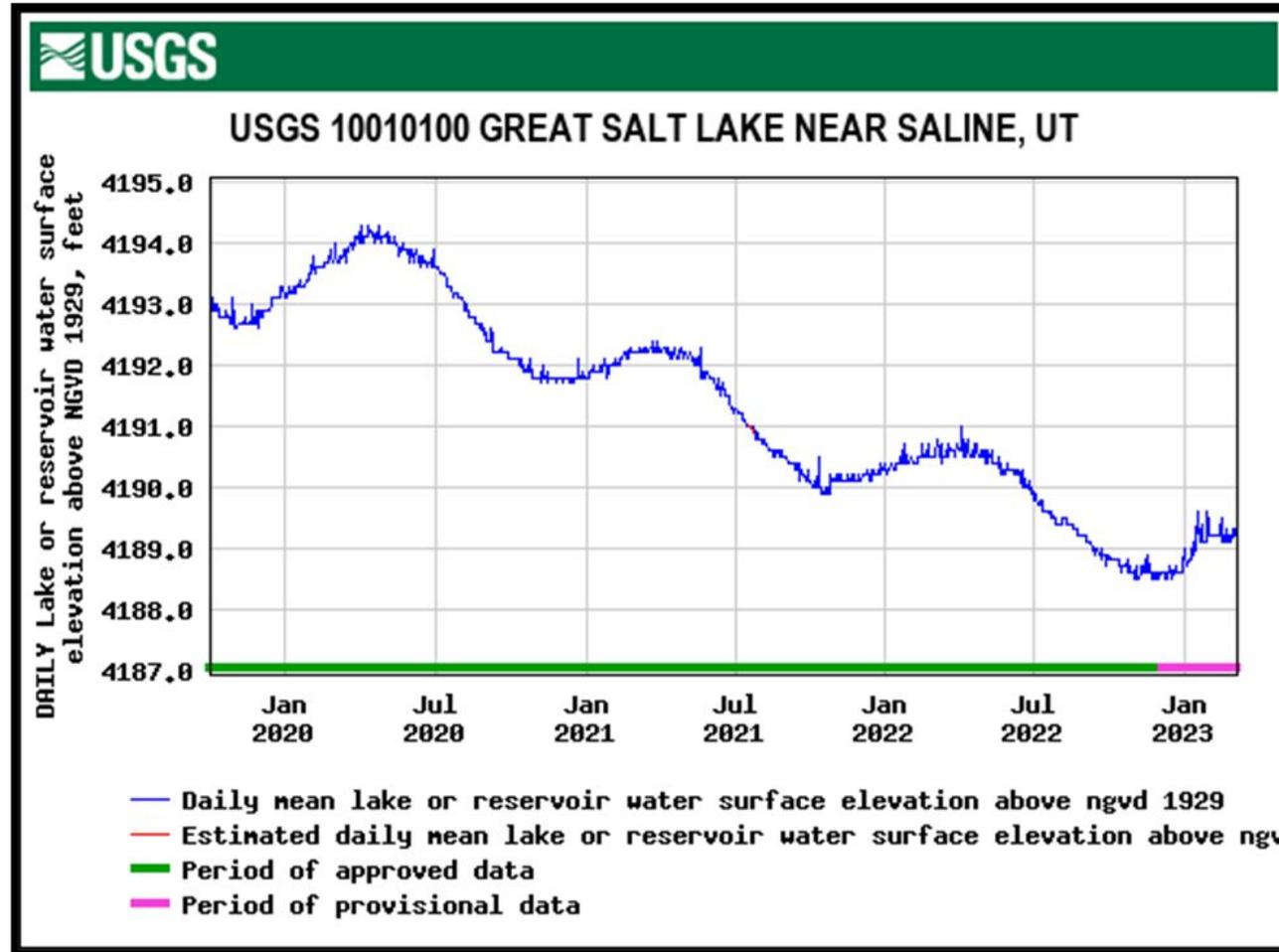


- ❑ Daily value 3/6/2023 = 4,190.4'
- ❑ Daily value 2/20/2023 = 4,190.1'
- ❑ Up about 1.9' since November

Provisional data, subject to revision

Agency - USGS Utah WSC  
Presenter - Ryan Rowland

# Great Salt Lake Water Surface Elevation – North Arm



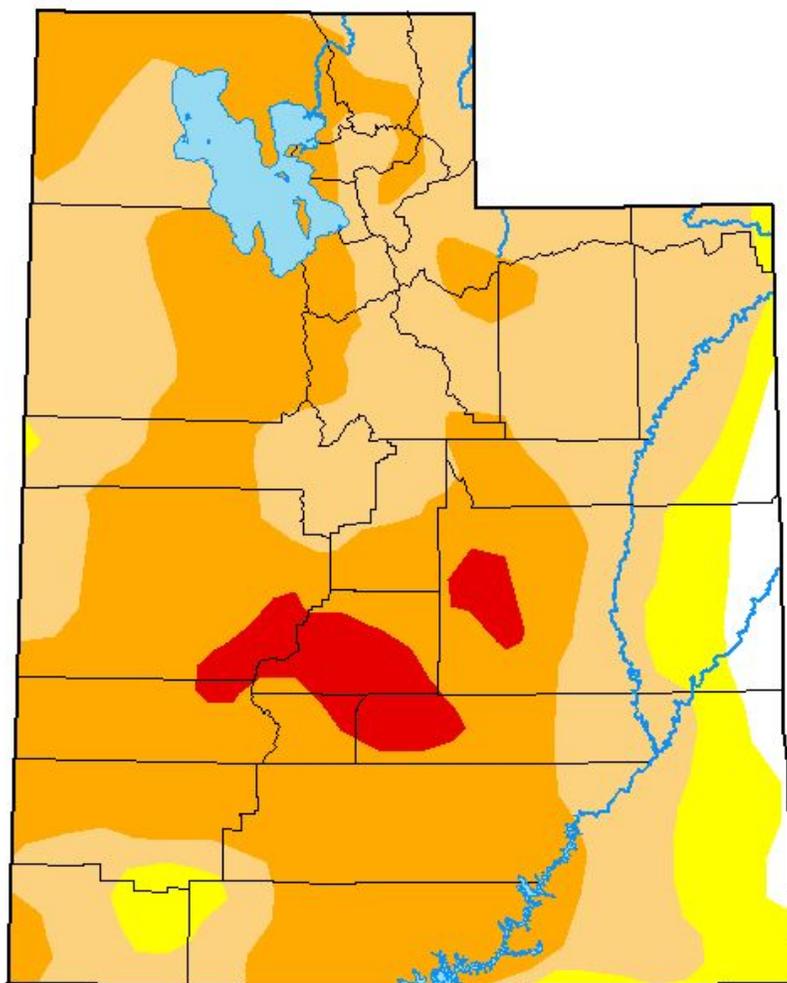
- ❑ Daily value 3/6/2023 = 4,189.3'
- ❑ Daily value 2/20/2023 = 4,189.1'
- ❑ Up about 0.8' since November

Provisional data, subject to revision

Agency - USGS Utah WSC  
Presenter - Ryan Rowland

# U.S. Drought Monitor Utah

**February 28, 2023**  
(Released Thursday, Mar. 2, 2023)  
Valid 7 a.m. EST



### Intensity:

-  None
-  D0 Abnormally Dry
-  D1 Moderate Drought
-  D2 Severe Drought
-  D3 Extreme Drought
-  D4 Exceptional Drought

*The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. For more information on the Drought Monitor, go to <https://droughtmonitor.unl.edu/About.aspx>*

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[droughtmonitor.unl.edu](https://droughtmonitor.unl.edu)